Coal Age

MARCH, 1945

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DETROIT

'COAL-FOR-VICTORY' AWARDS

SEE PAGE 68

SOLNUS OILS . . . eliminate hard carbon

. . . compressor valves last 3 years instead of 1 month

Every overhaul today delays production tomorrow . . . and when it is an important piece of equipment such as an air compressor, reducing shutdowns is a "must."

Hard carbon formed, valves cracked and new ones had to be installed at least once a month on a single-stage, 40 pound compressor in a New Jersey plant. The compressor was "taken down" for cleaning every four months. Then the maintenance men took the advice of a Sun Oil Engineer — a switch was made to Solnus Medium Oil.

Now, valves last for three years instead of cracking and being discarded in one month. Once a year the compressor is checked and cleaned. There is no hard carbon and valves are practically clean.

Reduce shutdowns in your mine, keep ventilating systems, jack hammers and other air-operated equipment working by eliminating unnecessary overhauls, caused by faulty lubrication. Solnus oils with their high lubricating and wear-preventing qualities and Sun Oil Engineering service offer you a combination that in hundreds of mines keeps production at its peak. Call in your local Sun Engineer today for information about Sun's complete line of quality lubricants for all mining machinery, or write to . . .

SUN OIL COMPANY · ***Philadelphia 3, Pa.***

Sponsors of the Sunoco News Voice of the Air — Lowell Thomas

SUNOCO **SUN INDUSTRIAL PRODUCTS**

OILS FOR AMERICAN INDUSTRY

From jitterbug ride to velvet glide — by rubber

A typical example of B. F. Goodrich development in rubber

THE postwar bus is already developed —and jiggles, bangs, bounces, and bumps are gone. Years ago, B. F. Goodrich engineers realized that, in addition to rubber tires, the shock-absorbing qualities of rubber could be used in springs, too, for greater riding comfort.

Finally, just before the war, they developed a "rubber hip" that suspends an automobile or bus body in soft, cushioning rubber. This device, the Torsilastic spring, is a steel cylinder placed lengthwise to the frame. Inside is a shaft. Space between cylinder and shaft is filled with rubber, attached by permanent bond to both metal surfaces. The weight of the bus gives a slight twisting action to the rubber.

Road shocks are lost in the rubber — they cannot pass through it to the car frame. The result is the "velvet ride" that has been the aim of automobile designing for decades.

War put a stop to use of natural rubber for this new spring. But now enough synthetic rubber has been released by the government to equip new Twin Coach buses badly needed for wartime transportation... their passengers will be floating on rubber and sitting pretty.

Some automotive men say the bus developments of today will be on your automobile tomorrow, so the rubber spring for the velvet glide may be on your postwar car — another contribution of B. F. Goodrich research. *The B. F. Goodrich Company, Industrial Products Division, Akron, Ohio.*

B.F. Goodrich

RUBBER *and* SYNTHETIC *products*

to do one thing . .

If you're "Smart as a Philadelphia Lawyer", you're pretty smart. This expression originated in 1730 when Andrew Hamilton, of Philadelphia, shone so brilliantly in defending a New York newspaper publisher, Peter Zenger, that the trial was credited with establishing freedom of speech, freedom of the press, and freedom of the judiciary—and, for Hamilton, a name to be remembered.

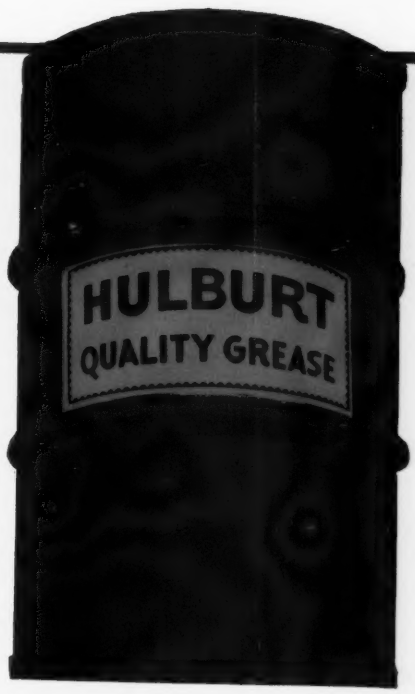
Mines that are "smart" use Hulburt's Quality Grease to lubricate their mine equipment. Hulburt Quality Grease, for a quarter of a century, has been a name to remember, too, and it is recognized by the mining industry as a grease that has proved its Quality. Hulburt Grease didn't just "happen". Years of tested research are behind its Quality.

HULBURT OIL & GREASE COMPANY . . PHILADELPHIA, PENNA.

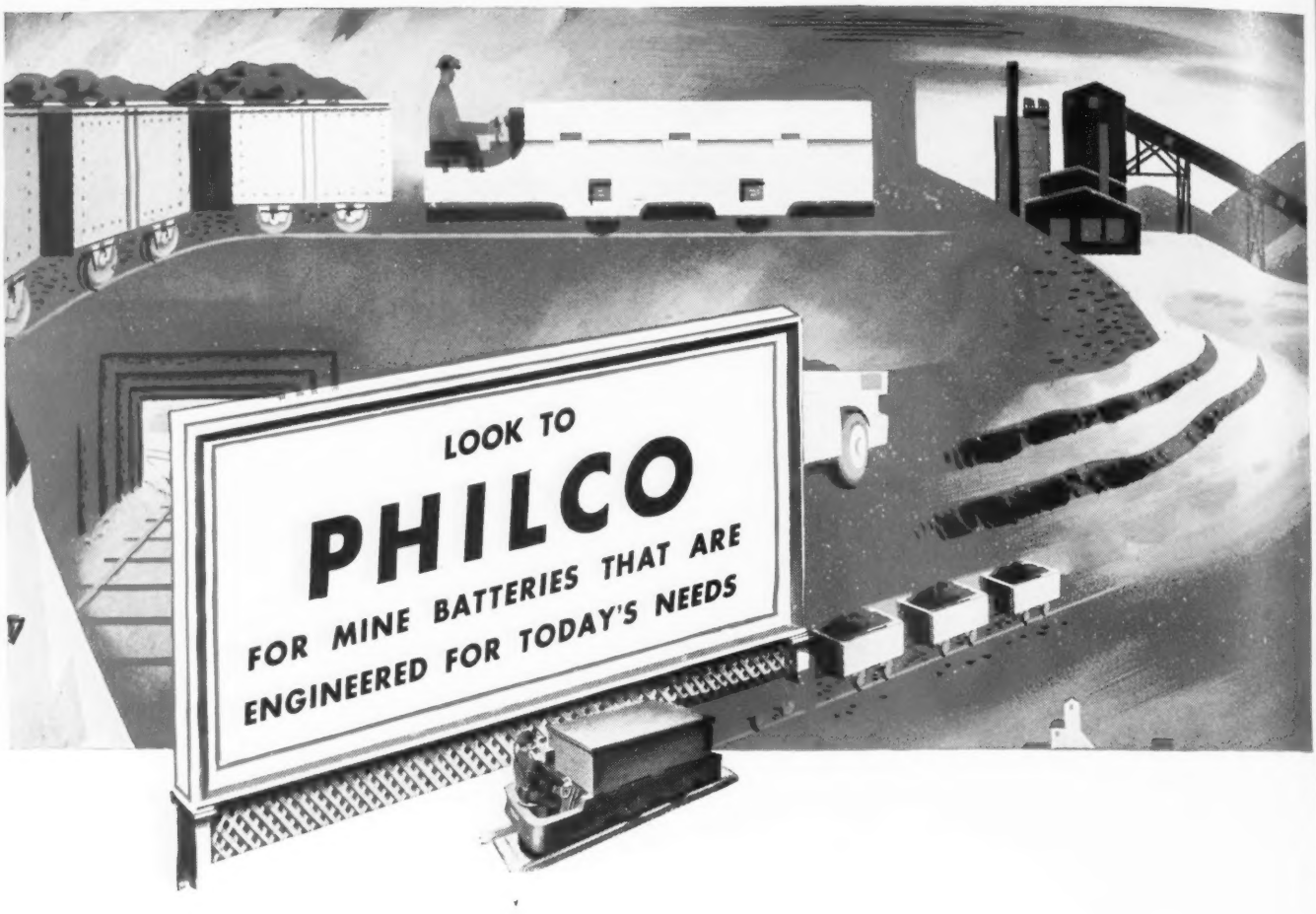
Specialists in Coal Mine Lubrication

. . and do it

SUPREMELY WELL



HULBURT *Quality* GREASE



Consistently through the years, users of PHILCO Mine Batteries have been first to get the major developments contributing to high capacity, greater efficiency, longer life, lower cost. Newest example of Philco leadership in mine storage battery engineering is the new Philco "Thirty" with *30% longer life*—now available in certain types and limited quantities for mine locomotives and shuttle cars. Catalogs of this and other modern Philco Batteries for the special needs of mine operators will gladly be sent on request. Philco Corporation, *Storage Battery Division,* Trenton 7, New Jersey.

The new Philco "Thirty", with 30% longer life, is identified by its distinctive red top

Modern Philco Shuttle Car Batteries provide high-capacity with proven long life

For Fifty Years a Leader in Mine Storage Battery Development

Coal Age

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Explosives are the tools of the blaster. From more than 120 Atlas grades and kinds, the blaster can pick the right one to make the most of his skill too.

ATLAS APEX low nitroglycerine, ammonium nitrate type of explosive in large size cartridges with a heaving, spreading action. Adapted for use in either horizontal or vertical drill holes. Available in eight strengths—each strength in three velocities (low, medium, or high)—there are 24 combinations of speed and strength. One of these should provide just the right action for your formation.

Working with explosives users, Atlas representatives have been able to help on many jobs. Perhaps they can make your equipment go further, too.

Go over your blasting problem with the Atlas Representative. Add your knowledge of your job to his specialized knowledge of explosives and methods . . . then select the Atlas explosive for the right blasting result.

APEX

GRADE	% Weight Strength	Velocity feet per second, in the open 1¼" x 8"	VELOCITIES 4½" x 16" CTGS.			Number of Cartridges per 50 lbs. 1¼" x 8"
			LOW	MEDIUM	HIGH	
A	35	7000	10500	13000	19000	115
B	30	6900	9500	13000	19000	115
C	25	6500	9000	13000	19000	115
D	20	6500	9000	13000	19000	115
1	40	7200	10500	13000	19000	115
2	50	7300	10500	13000	19000	115
3	60	7500	10500	13000	19000	115
4	70	7800	10500	13000	19000	115

Standard packing for Apex is: 4" x 8¼ lbs., 5" x 25 lbs., 7" x 50 lbs. | 4" x 12½ lbs., 6" x 25 lbs., 7½" x 25 lbs. | 5" x 12½ lbs., 6" x 50 lbs., 7½" x 50 lbs. | 5" x 16⅔ lbs., 7" x 25 lbs., 8" x 50 lbs.

ATLAS EXPLOSIVES

"Everything for Blasting"

CHEMICALS ATLAS EXPLOSIVES

ATLAS POWDER COMPANY, Wilmington 99, Del. • *Offices in principal cities* • *Cable Address—Atpowco*

THIS MAN CAN HELP SPEED UP YOUR DRILLING

He is a COALMASTER Drilling Expert—on our payroll to work for *you*.

Right now, when you're faced with demands for more tonnage on top of the manpower shortage, he can give you priceless help.

He'll show you how to:

- **Drill better blast holes faster—**
- **Reduce time lost and maintenance cost—**
- **Increase efficiency and safety of inexperienced drillers—**

by selecting the proper "Matched Set" COALMASTER Tools to meet the special characteristics of your coal. That means tools engineered for teamwork from thread bar to drill bit—for peak hole production.

Tell us your drilling problems—COALMASTER Drilling Experts are available to help you solve them.

DRILLING COALMASTER TOOLS

CENTRAL MINE EQUIPMENT CO.

ST. LOUIS 8, MO.

Rock is "Duck Soup" FOR MARION SHOVELS

15 YEARS AGO we said:

"MARION is a real rock shovel".

MARIONS have stood the test of time and always will be the leader in rock or dirt digging.

What are your problems? Let's discuss them.

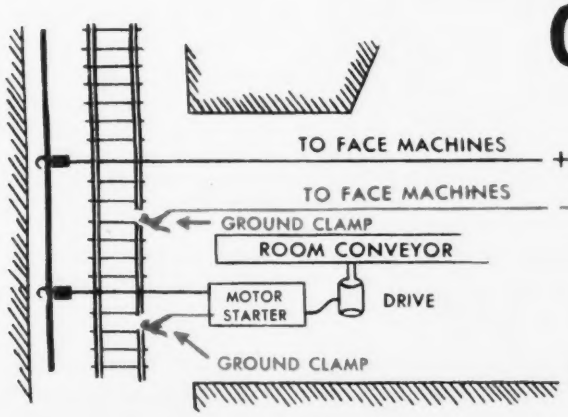
THE MARION STEAM SHOVEL CO. • MARION, OHIO

SHOVELS • DRAGLINES • CRANES • PULL-SHOVELS

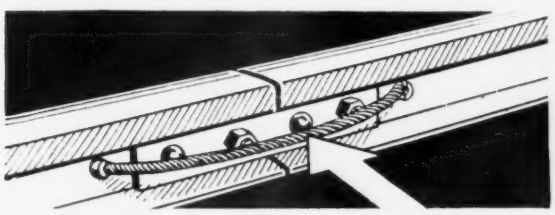
CLAMSHELLS • WALKERS • *from 3/4 cu. yd. to 35 cu. yds.*

For tight, vibrationless return circuit connections

Use O-B Plier-Type GROUND CLAMPS



Typical room neck layout showing O-B Plier-Type Ground Clamps being used to connect both the room cables and motor starter ground leads to the return circuit. A junior size Plier-Type Ground Clamp is also available for connecting light, portable electrical equipment.



Plier-Type Ground Clamps may be connected either to the rail bond strand, as illustrated here, or to the negative feeder if available.

Safe rubber handles protect the operator from electrical shock.

NO. 2554-M

TWO SIZES AVAILABLE	For the following range of bond cable or negative feeder sizes . . .	And the following range of machine cables.
Standard Size, No. 19383	No. 1 to 1,000,000 CM	No. 14 to 4/0
Junior Size, No. 19907	No. 1 to 4/0	No. 14 to No. 4

Ohio Brass

MANSFIELD, OHIO

Canadian Ohio Brass Co., Ltd., Niagara Falls, Ont.

HERE'S WHY WE SAY: Allis-Chalmers are Unbiased...

VIBRATING SCREENS	Aero-Vibe	For Light Duty Sizing or Re-Screening. One or Two Decks.
	Ripl-Flo	Moderate to Heavy Duty Service. One, Two or Three Decks.
	Low-Head	High Capacity, For Wet or Dry Screening, One or Two Decks.
	Electro-Magnetic	For Fine Wet or Dry Screening, Open or Enclosed Styles.
CENTRIFUGAL PUMPS	Type "S"	Single Stage, Double Suction — for Coal Washing & Preparation, Mine Drainage & Dewatering.
	Type "M"	Double Suction, Multi-Stage — Mine Drainage & Dewatering.
	Electrifugal & "SS-Unit" Types	Single-Suction, Single & Two-Stage — for Dewatering, Washing and General Service.
	Special Types	"CW" for Washing Service. "OA" Self-Priming — Gathering.
TRACTORS & ALLIED EQUIPMENT	Crawler & Wheel Tractors	Diesel, Gasoline, Butane, etc. for Hauling and Stripping . . . with Shovels, Bulldozers, Scrapers and other Equipment.
	Power Units	Gasoline, Butane and Low-Grade Fuels; Five Models, 15 to 110 hp — with Pulleys, Gears, for Direct Coupling.
HOISTS	Equipped with new "Regulex" Exciter, Allis-Chalmers Mine Hoists Assure Accurate, Automatic Speed Control.	

ALLIS-CHALMERS

of Basic Processing Equipment — Recommends

Recommendations

A GLANCE AT THE "BREAKDOWN" below gives you a rough idea of the broad range of equipment A-C builds for coal producers and distributors. This "breakdown" is not complete, for A-C builds over 1600 *different* products — many of them widely used in this industry.

The significant fact is that A-C builds *all types* of basic processing equipment . . . many different styles and sizes. When you need a screen, for example, selection can be made—not from one—but *four different* styles. This means you get the *exact* equipment for your application. Yes, A-C recommendations *are* unbiased . . . because they're based on the job to be done—not an improvised way of doing it!

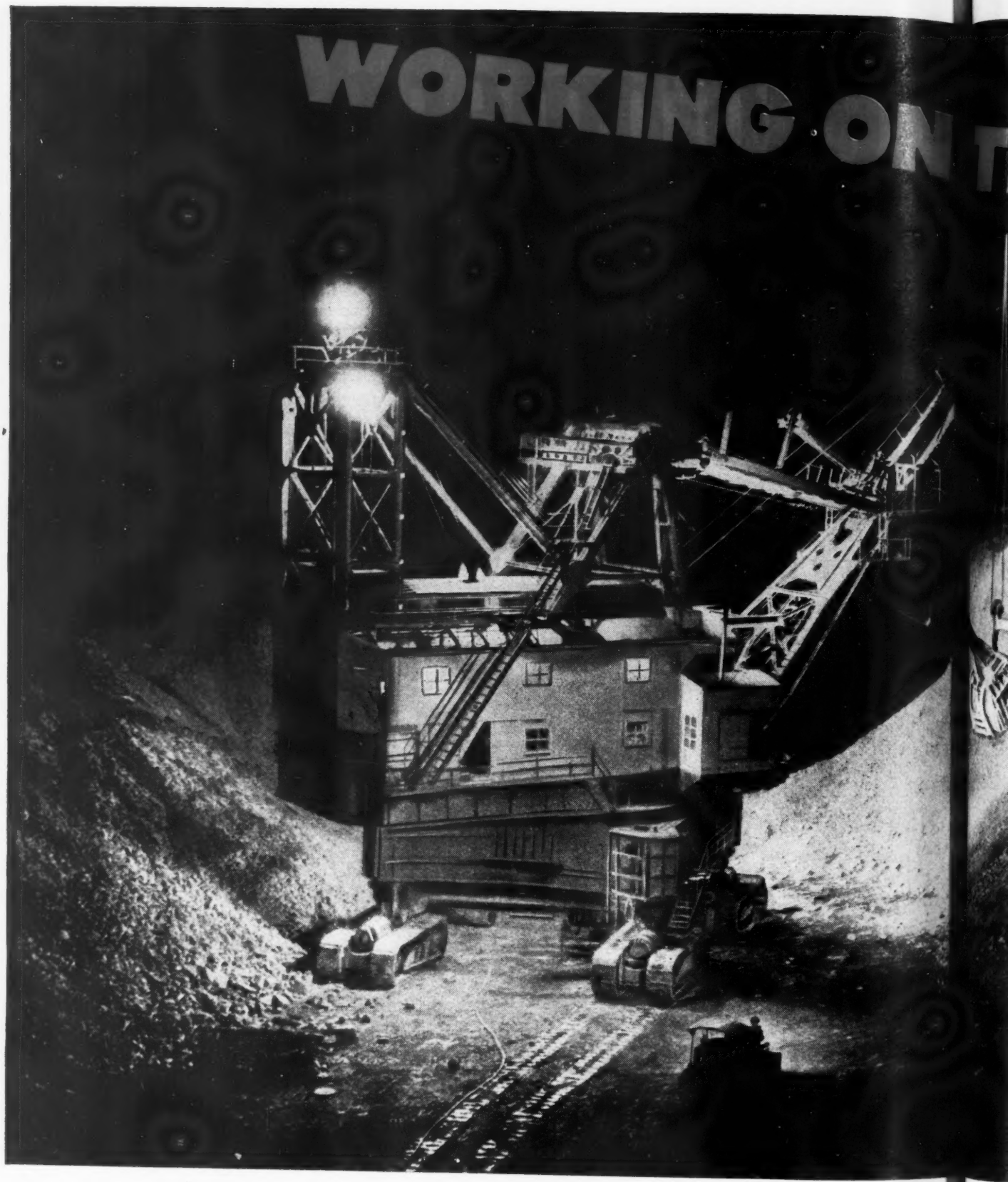
Next time *you* have a processing problem call on A-C. ALLIS-CHALMERS, MILWAUKEE 1, WIS.

A 1739-C

POWER & ELECTRICAL	Power Plants	Turbines & Condensers Generators Boiler Feed & Condenser Pumps
	Distribution & Control	Transformers Voltage Regulators Unit Substations Switchgear Circuit Breakers Switchboards & Control
	ac/dc Conversion	Motor-Generator Sets Synchronous Converters Mercury Arc Rectifiers
MOTORS & CONTROL	Lo-Maintenance Motors	Squirrel Cage Wound Rotor Synchronous Direct Current
	Large Motors	A-C & D-C to 5,000 hp with Control
	Gearmotors	All-Motor or Integral—for Machine Mounting
	Motor Controls	Open or Enclosed Starters Combination Starters
TEXROPE V-BELT DRIVE PRODUCTS	Sheaves	Constant Speed Variable Speed
	Speed-Changer Units	Manual or Motor-Operated
	V-Belts	Heat-Resisting Super-7 Oil-Resisting Super-7 Oil-Proof Super-7 Static-Resisting Super-7 Super-7-Steel

BUILDS ALL TYPES

the Exact Type Suited to Your Particular Needs!



TEXACO

TEXACO LUBRICANTS Fo

THE NIGHT STRIP

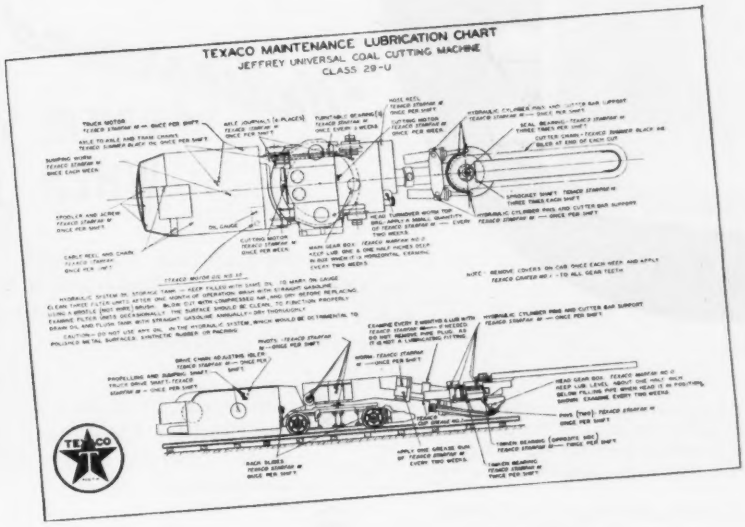
THERE'S no let-up yet in the demand for coal. Strip mining goes on night and day. Giant electric shovels, like the one in the photo, remove overburden in 40-ton bites.

Smoothly functioning wire rope plays an important part in the smooth, steady operation of these mammoth machines . . . and to keep wire rope well conditioned, flexible, and protected against weather and core-rot, experienced operators lubricate with *Texaco Crater.*

Texaco Crater penetrates into and preserves the core of wire rope, preventing collapse. It seals each wire in a tough, viscous film that reduces internal friction and wear, keeps out moisture, prevents corrosion, and keeps rope strong longer.

Texaco Crater serves coal mining in other ways, too. Used on certain types of gears in mine locomotives, for example, it cushions load shocks, quiets noise, reduces wear. *Crater* doesn't ball up, channel or throw off, but clings to tooth surfaces, following through from gear to gear, despite high pressures, temperatures and peripheral speeds.

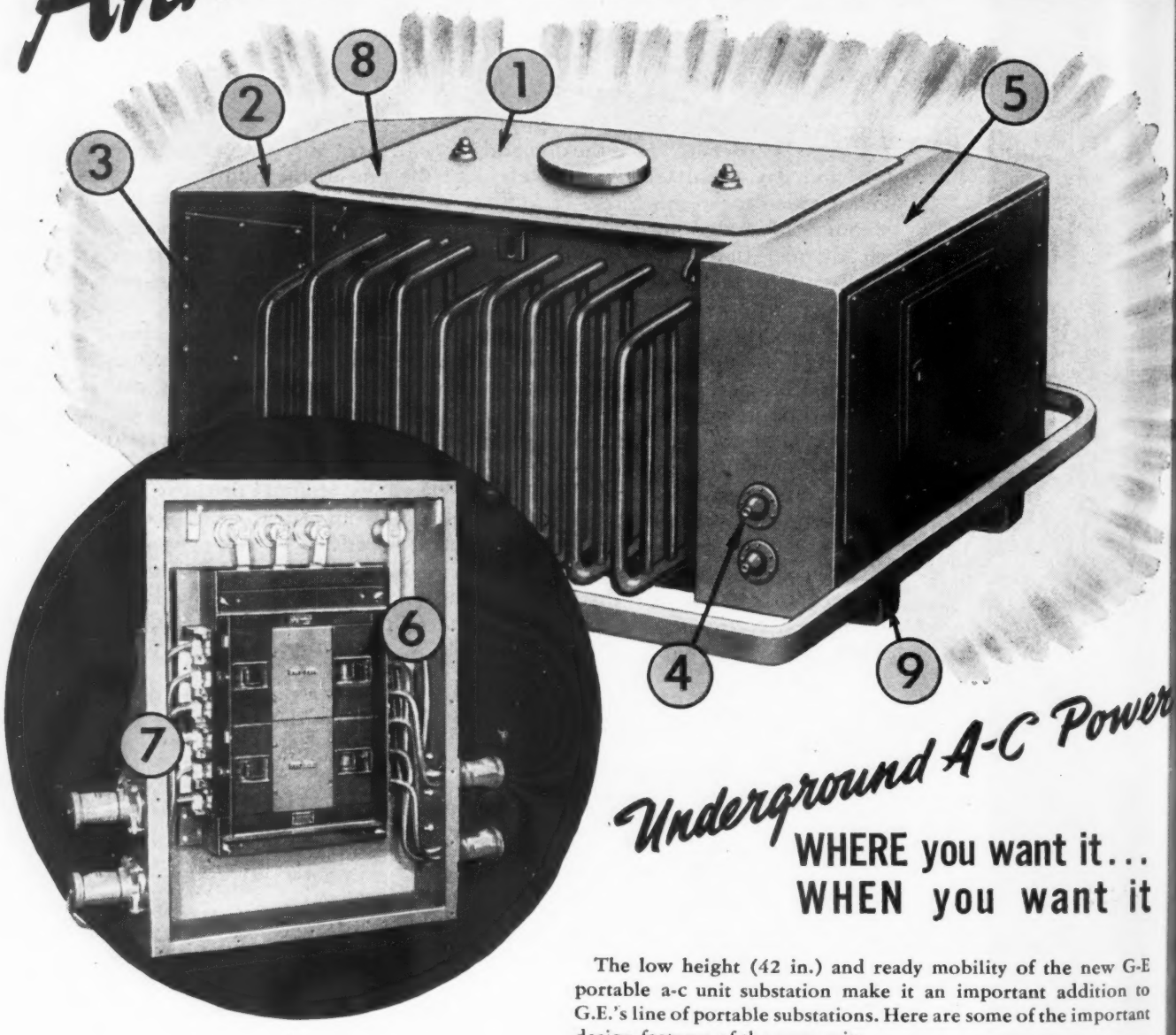
Texaco Lubricating Engineering Service is available to you through more than 2300 Texaco distributing plants in the 48 States. The Texas Company, *National Sales Division, Dept. C,* 135 East 42nd Street, New York 17, N. Y.



FREE! Texaco Maintenance Lubrication Charts for underground mining machinery show clearly not only *where* to use Texaco, but *when* and *with what* lubricant to service each lubrication point in all leading makes of cutters, loaders, locomotives, etc. Order Charts you need by make and model.

For the Coal Mining Industry

Announcing A NEW PORTABLE



Underground A-C Power

WHERE you want it... WHEN you want it

The low height (42 in.) and ready mobility of the new G-E portable a-c unit substation make it an important addition to G.E.'s line of portable substations. Here are some of the important design features of the new unit:

1. All-welded, steel transformer tank is completely sealed and pressure-tested before leaving the factory. The all-metal enclosure is safely grounded, and easy to keep clean. There are no dust-collecting air ducts.
2. Primary junction box includes solderless connectors. Where desired, three gang-operated, oil-filled cutouts can be supplied (for circuits below 5000 volts).
3. Removable plate gives ready access to handle of ratio adjuster, for easy and safe changing of taps when the transformer is "dead."
4. Cable stuffing boxes permit cables to be clamped in place, and prevent dust and water from entering air-circuit-breaker compartment.
5. Outdoor-type dustproof and weatherproof air-circuit-breaker compartment provides ample protection for both underground and outdoor service.
6. Air circuit breakers for low-voltage feeders. They are rated for 15,000-amp interrupting capacity and include thermal time trip and instantaneous high-current trip.
7. Low-voltage receptacles and plugs can be supplied for circuits of 200 amp and less when specified.
8. Transformer section is filled with Pyranol*—General Electric's nonsludging cooling and insulating liquid that will not burn.
9. Skid-type base, with protective bumper. The substation can be mounted on wheels to fit any track gage used in mines.

*Trade-mark Reg. U.S. Pat. Off.

UNIT SUBSTATION

TO KEEP A-C MOTOR SPEEDS UP AND COPPER COST DOWN

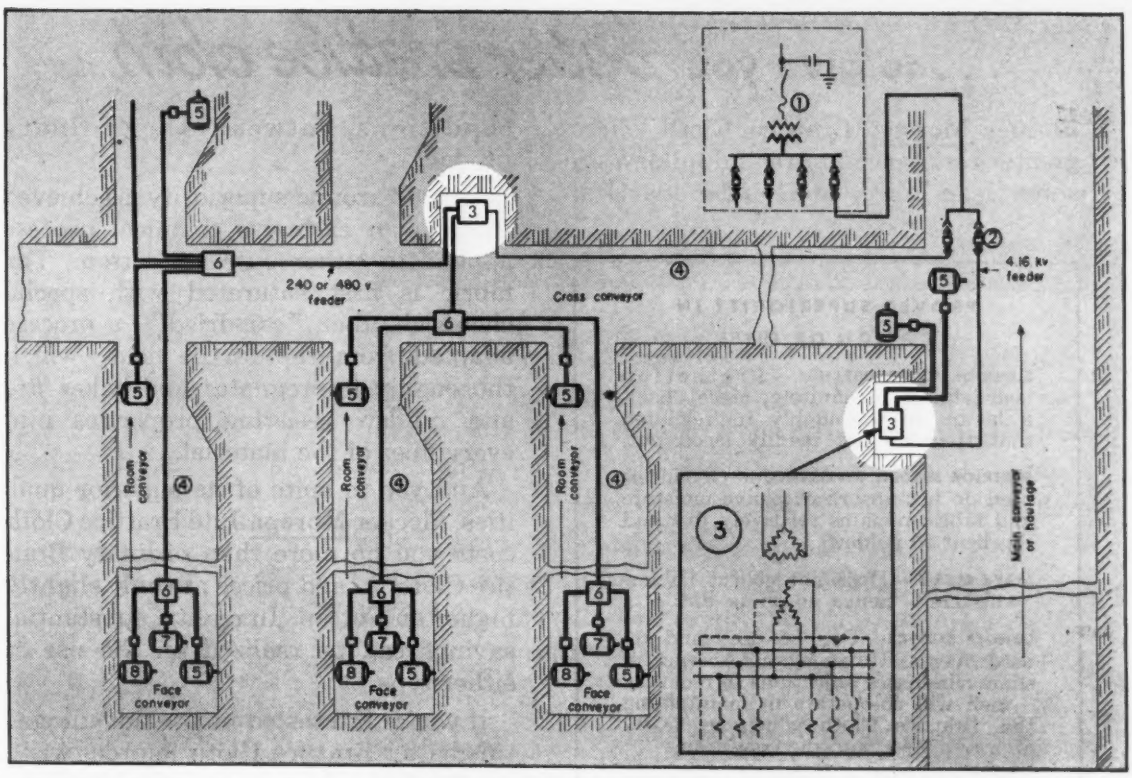
NOW IT IS EASIER than ever before to run your high-voltage a-c feeders right up close to the working face. It is easier to cut down the length of your heavy, costly low-voltage secondaries. It is easier to eliminate the voltage drop which slows down machines and production.

This new, *complete* G-E unit substation was specially designed for modern a-c mine service—to make it a simple, practical matter to keep moving your transformer in as new rooms are developed. It is surprisingly compact (only 42 inches high!). It is readily portable.

The new G-E unit is designed around Pyranol transformer sections for maximum safety. It is completely metal enclosed, mounted on skids (or wheels if required), and includes all the necessary components for handling 2400- to 7200-volt incoming lines and outgoing low-voltage feeders of 600 volts or less. All electrical and mechanical components are *fully co-ordinated* by one manufacturer, assuring you of long, dependable service.

The typical plan below shows how this new unit substation can be used to supply power to conveyors, fans, drills, pumps, loading machines, cutters, and other a-c mining machinery. For adaptation to your electrical layout, you'll want detailed information on sizes, weights and dimensions, and technical data on equipment and ratings. Write today for Bulletin GEA-4301.

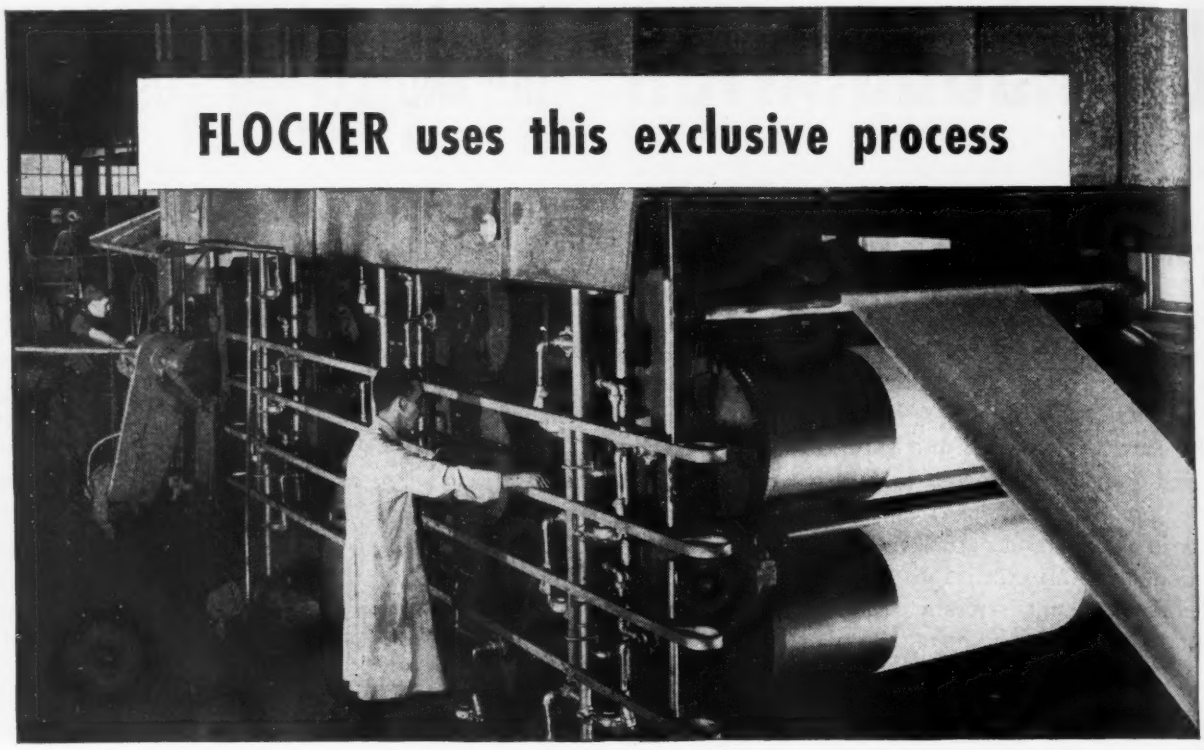
General Electric Company, Schenectady 5, N. Y.



Typical a-c mine distribution system, showing how the new G-E low-height, portable, mine-type, a-c unit substation can bring high-voltage primary power closer to the working face. (1) Master unit substation at entrance to mine (2) Sectionalizing circuit breakers (3) New G-E PORTABLE A-C UNIT SUBSTATION (4) Mine-type cable (5) Conveyor drives (6) Low-voltage distribution box (7) Loader drive (8) Cutter drive

Buy all the BONDS you can—*and keep all you buy*

GENERAL ELECTRIC



. . . to give you *better brattice cloth*

Flocker Moropa Brattice Cloth offers greater resistance to fire and mildew . . . stays clean longer and, under identical conditions, outwears the ordinary product.

This all-around superiority is achieved through an exclusive chemical process applied to either Jute or Cotton. The fabric is first saturated with special chemicals, then "can-dried"—a process adapted from the textile field—which thoroughly impregnates and bakes fire and mildew resisting properties into every fiber of the material.

And yet, in spite of its superior qualities, Flocker Moropa Jute Brattice Cloth costs you no more than ordinary Brattice Cloth . . . and prices are only slightly higher on Cotton. In reality, substantial savings can be realized on the use of either type.

If you're interested in the advantages this better Brattice Cloth affords, write for detailed information and quotations.

PROVED SUPERIORITY IN COTTON OR JUTE!

SUPERIOR FIRE-RESISTANCE—Protection lasts almost indefinitely, since chemicals are so thoroughly impregnated that they do not readily leach out.

SUPERIOR MILDEW REPELLENCE—Chemicals used do not absorb excessive moisture and fabric remains relatively dry and repellent to mildew.

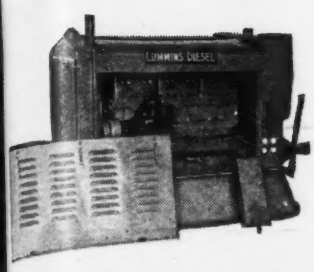
STAYS CLEAN—Does not collect mildew "whiskers"—hence no slimy dirt.

LONGER SERVICE—Can be used and re-used over and over again. Absence of slime eliminates objections to recovery—men will co-operate in maintaining this Brattice Cloth which so vastly improves their working conditions.

JOHN FLOCKER AND COMPANY

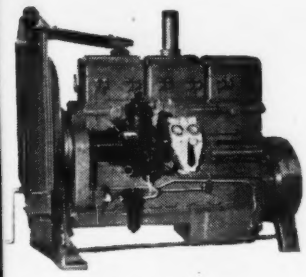
644 GRANT STREET, PITTSBURGH 30, PA.

Since 1822, Ropes, Slings, Nets and Cordage Fittings, Tackles, Waxed and Unwaxed Linen . . . Specialists in Cordage Problems . . . Wire Rope



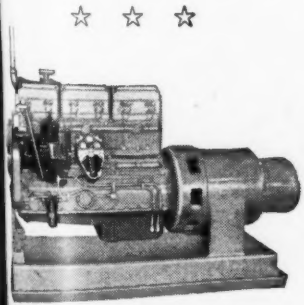
Model H Cummins Diesel is offered in both four and six-cylinder arrangements, developing maximum output of 100 and 150 hp., respectively. This engine is manufactured in a complete line of industrial and automotive models, such as the Model HP-600 power unit, shown above, and Model HBI-600, right, for wheel or track-mounted equipment.

☆ ☆ ☆



The Model HIP-600 is an open type power unit incorporating the same basic engine as that described above. It has a 4⅞" bore and 6" stroke, the six-cylinder unit having a piston displacement of 672 cu. in., and the four-cylinder, 448 cu. in.

☆ ☆ ☆



The Model HGA-601 is an AC generating set, rated 50 kw. at 1200 rpm. The four-cylinder Model H generating set is rated 30 kw. at 1200 rpm. Both four and six-cylinder sets are also available for DC operations.

A look at the Cummins Diesel's long record of profitable, dependable performance in all types of mining applications proves that—in this industry—one diesel does the complete job! In both open pit and shaft operations . . . in heavy-duty trucks, shovels, cranes, draglines and locomotives . . . in the widest variety of portable and stationary applications . . . Cummins Diesel power has consistently demonstrated its ability to get the job done in less time . . . at a lower cost.

CUMMINS ENGINE COMPANY, INC., Columbus, Indiana.

GOODMAN *Tandem*

ARMY E NAVY

GOODMAN MANUFACTURING COMPAN

LOCOMOTIVES

- where a powerful locomotive is needed, but space prevents use of one large unit
- when a higher total horsepower is required than is possible with a single locomotive
- where high speed operation is desired on light rails, but one big unit is too heavy

then GOODMAN TANDEM LOCOMOTIVES "fill the bill."

Complete details are available at no obligation to you.

ALSTED STREET AT 48TH • CHICAGO 9, ILLINOIS

What's Your Piping Materials Problem? ...CRANE Has the Answers!

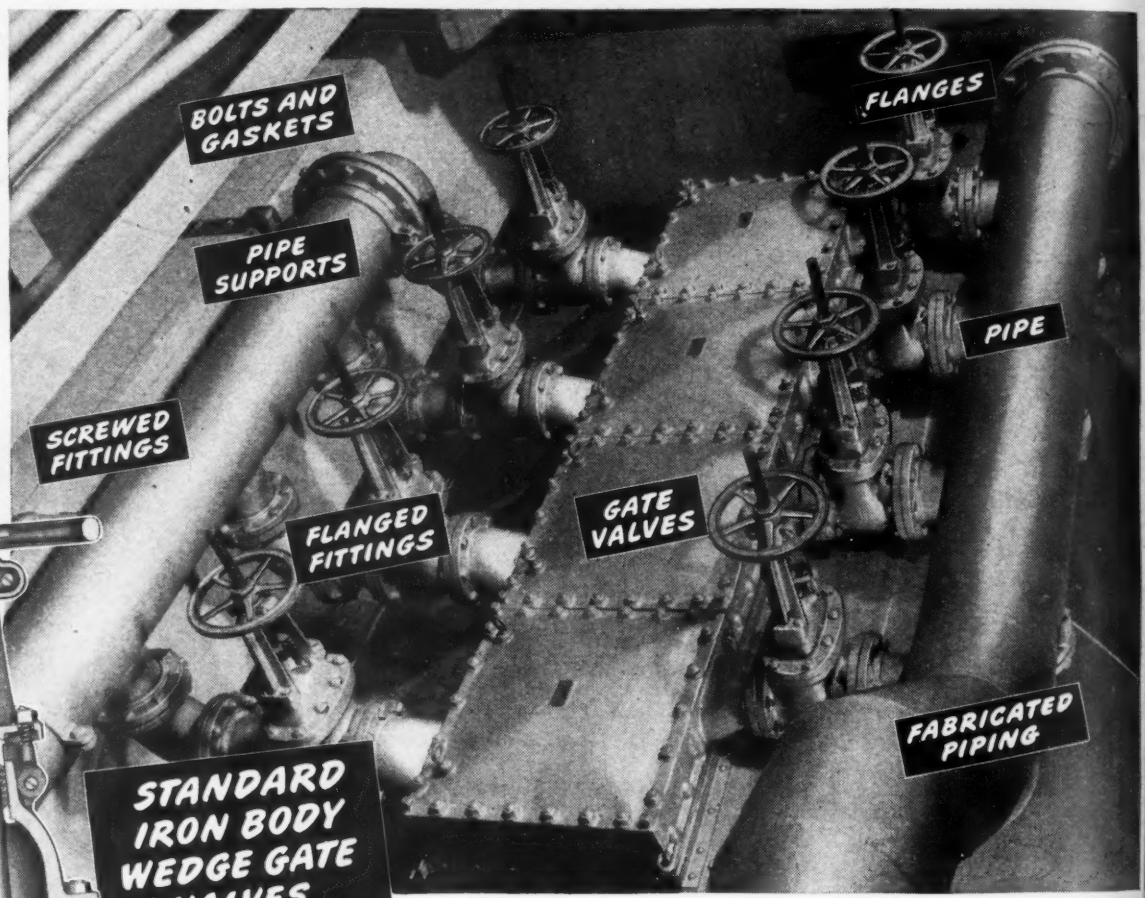
ONE SOURCE OF SUPPLY

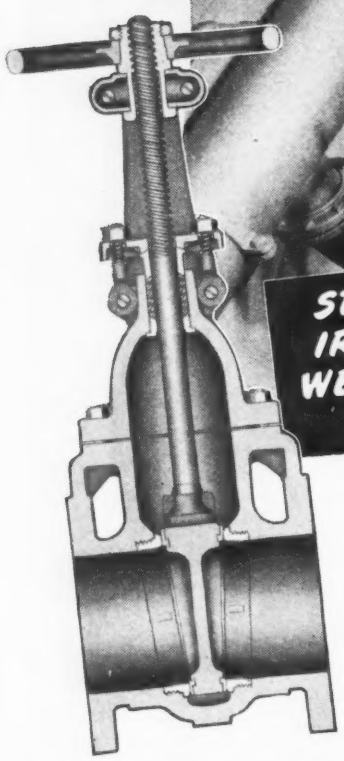
ONE RESPONSIBILITY FOR ALL PARTS

ONE STANDARD OF QUALITY

No matter what your need in piping materials ... your Crane Branch or Wholesaler can meet it. One order covers all requirements at any time. You choose from the world's greatest line of piping materials—in brass, iron and steel. You help assure the best piping installation because all parts are of uniformly high quality—backed by a single responsibility. Not only do you simplify and speed deferred replacement work by using Crane *complete* piping materials service—but you get full benefit of Crane Co.'s 90-year experience in the piping equipment field.

Water inlet and outlet to generator air coolers in power plant.





STANDARD IRON BODY WEDGE GATE VALVES

SERVICE RECOMMENDATIONS: **Crane Standard Iron Body Wedge Gate Valves** with brass trim are recommended for steam, water or oil lines; all-iron valves for oil, gas or fluids that corrode brass but not iron. Made in O.S. & Y. and Non-Rising Stem patterns.

Working Pressures

Size of Valve	Screwed or Flanged Valves		Hub End Valves
	Saturated Steam	Cold Water, Oil, or Gas, Non-Shock	Cold Water or Gas Non-Shock
2 to 12 in.	125 pounds	200 pounds	200 pounds
14 and 16 in.	125 pounds	150 pounds	150 pounds
18 to 24 in.	*	150 pounds	150 pounds

*For steam lines larger than 16-inch, Crane 150-pound Cast Steel Gate Valves are recommended.

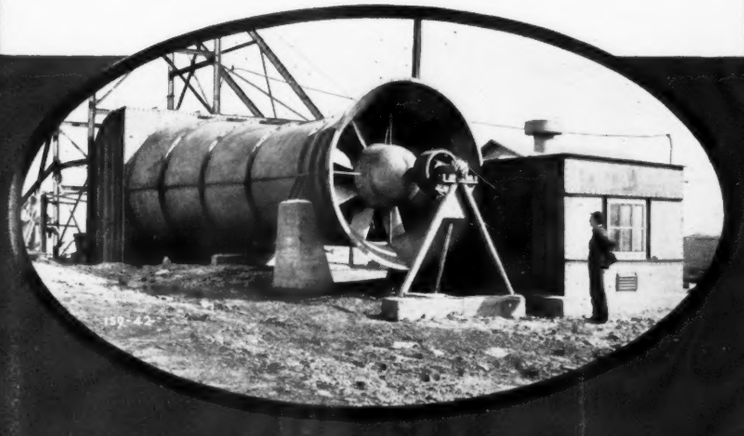
CRANE CO., General Offices: 836 S. Michigan Ave., Chicago 5, Ill. • *Branches and Wholesalers Serving All Industrial Areas*

CRANE — 90 YEARS OF PROGRESS 1855 1945 — **VALVES • FITTINGS • PIPE**
PLUMBING • HEATING • PUMPS

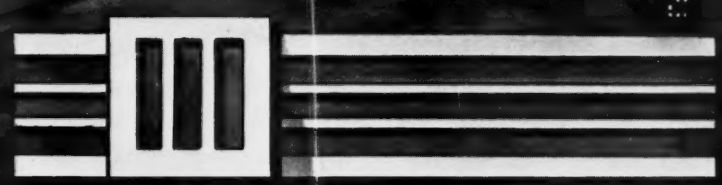
JEFFREY AERODYNE FANS

The Jeffrey Aerodyne Fan is especially designed to reduce ventilation costs. It is available in single or double stage units for operation against mine pressures up to 8" and 16" water gauge respectively. Installation cost is below that of average reversible centrifugal mine fans of equal capacity and the design permits reversal of the mine air by merely reversing direction of rotation of the motor. May be furnished with either fixed or adjustable rotor blades.

Illustrated at the right is a typical Jeffrey Aerodyne Fan installation at a large Utah coal mine. A close-up of a similar fan in another installation is shown below.



The Industrial Plants of this Nation Consume 145,000,000 Tons of Coal *Annually*



Jeffrey Drills, Cutters, Loaders, Mine Conveyors, Locomotives, Fans and a host of allied equipment and Replacement Parts aid the operator in maintaining an adequate supply of coal to keep the wheels of industry turning.

this Nation
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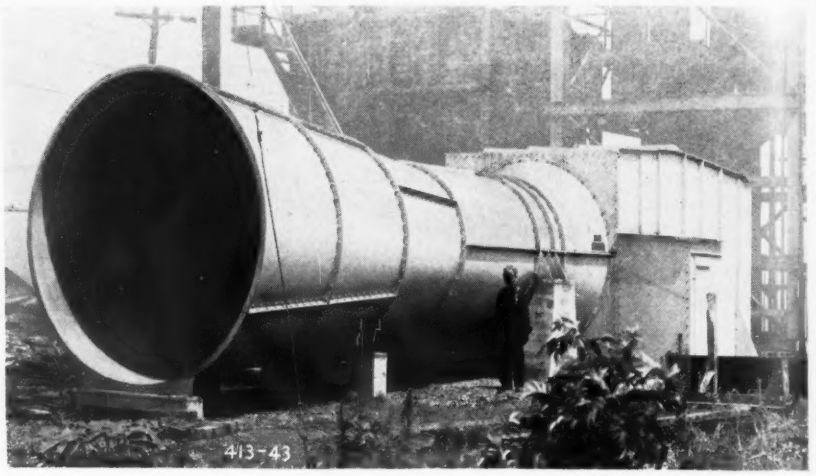
Jeffrey VENTILATION

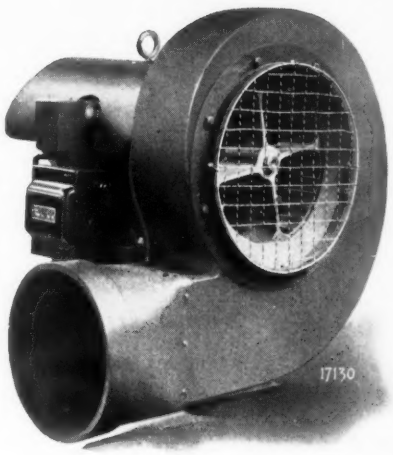
JEFFREY SERVICE TO THE COAL MINES MEANS SERVICE TO ALL INDUSTRY

JEFFREY EQUIPMENT FOR COAL MINES

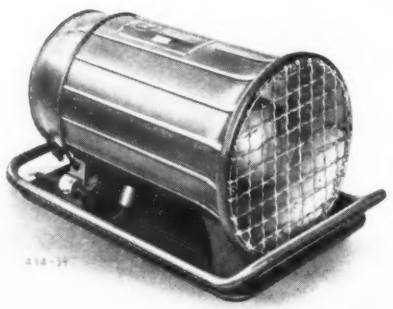
- BLOWERS
- CONVEYORS
- CRUSHERS
- CUTTERS
- DRILLS
- FANS
- JIGS
- LOADERS
- LOCOMOTIVES
- SCREENS



Jeffrey 8 H—84 Aerodyne Mine Fan equipped with air lock and adapter.



Jeffrey Universal Blower with adjustable angle of discharge — applicable for blowing or exhausting.



Jeffrey Aerodyne Midget Tubing Blower. Propeller type and flameproof.

THE JEFFREY MANUFACTURING COMPANY

Established in 1877

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Sales Offices:	Baltimore Birmingham Boston Buffalo	Chicago Cleveland Cincinnati Detroit	Denver Harlan Houston Huntington	Milwaukee New York Philadelphia Pittsburgh	Scranton St. Louis Salt Lake C
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Foreign Plants:	Jeffrey Mfg. Co., Ltd. Montreal, Quebec	British Jeffrey-Diamond, Ltd. Wakefield, England		Jeffrey-Galion (Pty), L Johannesburg, S. A.	

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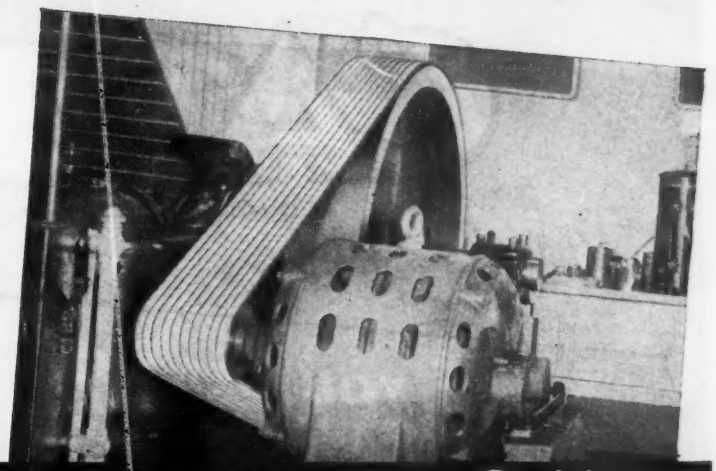
COAL AGE



an Important Fact

GATES *Synthetic Rubber* V-Belts

—are *TODAY* Giving *BETTER SERVICE* Than *ANY* V-Belts Built *Before the War!*

and the Reason for it

When our Army's tanks, tractors and self-propelled big guns were being built, it was found that no V-Belts built by anyone before the war could stand the service that is now being delivered on the battlefield by V-Belts that Gates has developed especially for these heavy combat units. And Gates is building these V-Belts entirely of synthetic rubber.

✳ **The fact that Gates developed these belts—and is building them of synthetic rubber—is important to you now because every improvement developed by Gates for these Army belts has also been added, day by day, to the quality of the Standard Gates Vulco Ropes which are being delivered to you.**

As you know, wartime improvements in many other products must be withheld from general use until after the war is won—but victory depends so directly upon production, and production so directly upon V-Belts which drive the producing machines, that Gates has been able to give you immediately in your Standard Gates Vulco Ropes, every V-Belt improvement which Gates specialized research has developed for use on the Army's motorized equipment.

These are the simple reasons why you are finding that your Standard Gates synthetic rubber Vulco Ropes are today giving you better service than any V-Belts that were ever built before the war.

THE MARK OF Gates SPECIALIZED RESEARCH

THE GATES RUBBER COMPANY

Engineering Offices and Jobber Stocks in All Large Industrial Centers

453

GATES VULCO ROPE DRIVES

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CARDOX

"THE NON-EXPLOSIVE MINING METHOD"

HELPS YOU GET THE

Full Benefits

OF MECHANICAL LOADING

KEEPS LOADER PRODUCTIVE MORE HOURS EACH SHIFT

FIRMER COAL STRUCTURE WITHSTANDS MECHANICAL HANDLING

ROLLS COAL FORWARD FOR EASIER LOADING

LESS SHATTERING OF IMPURITIES REDUCES CLEANING COSTS

CARDOX
Hardsocg Drilling Equipment
Complete line of drilling equipment designed to give you the maximum in drilling efficiency.

CARDOX makes it possible to get the most out of modern mechanical mining equipment. For example, loading is faster . . . with less wear and tear on mechanical loaders.

Equally important, hand digging is reduced to a minimum, and coarse sizes produced by the gentle heaving action of CARDOX are most economical to clean. In many mines a substantial percentage of impurities are kept so large that they can be picked out at the face by hand . . . making it unnecessary to haul them to the surface. Write for full details on free demonstration of CARDOX under your current working conditions.

CARDOX CORPORATION

BELL BUILDING • CHICAGO 1, ILLINOIS

GET THE *Right* WIRE ROPE

More and more, stripping operations have been making headlines in the coal industry. Small wonder, with mechanical monsters like this one on the job! His teeth bite deep, and the yardage he moves is tremendous.

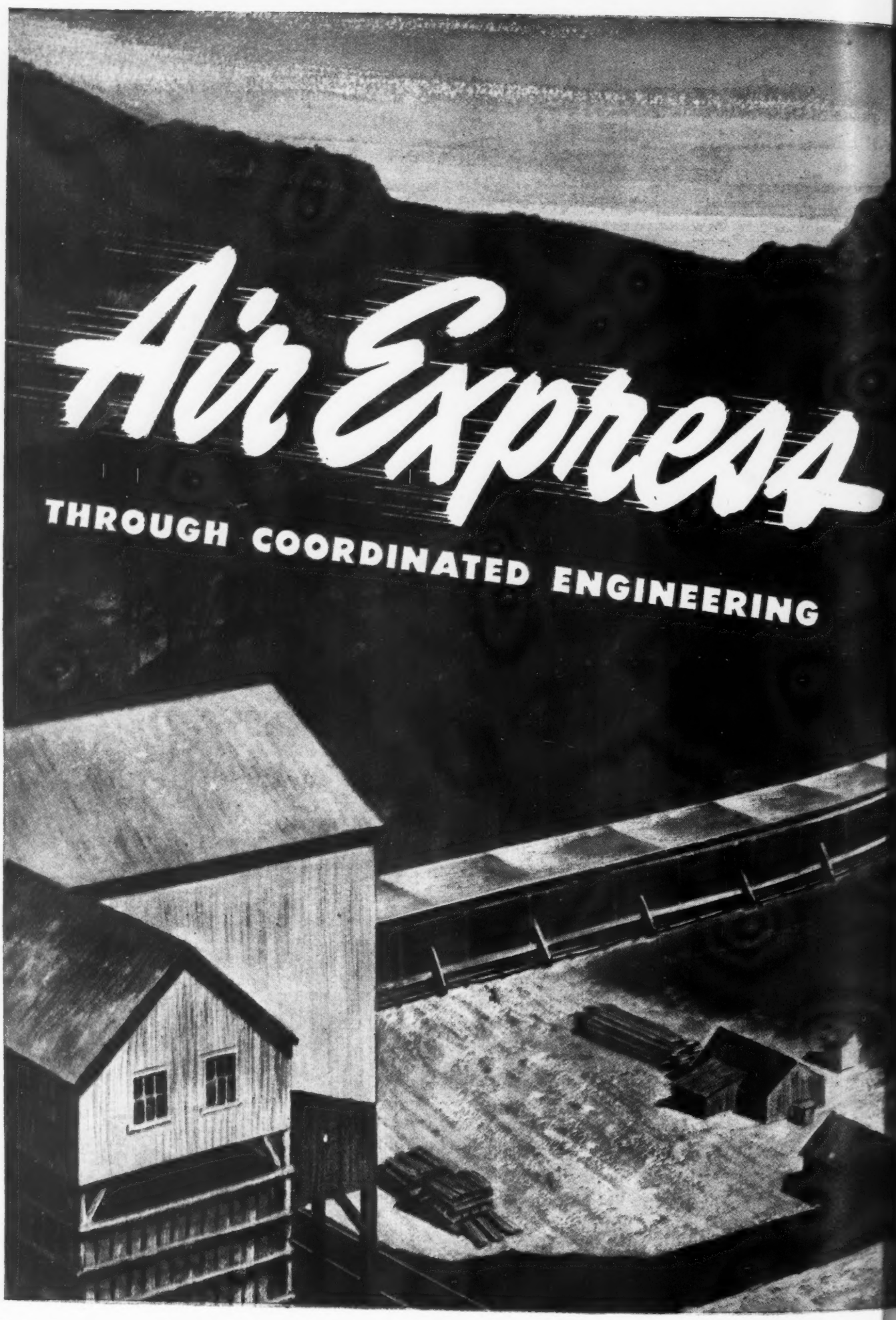
But wire rope, too, has a vital bearing on the amount of useful work accomplished by a dragline machine. The longer its ropes stay in service, the less time it spends out of action.

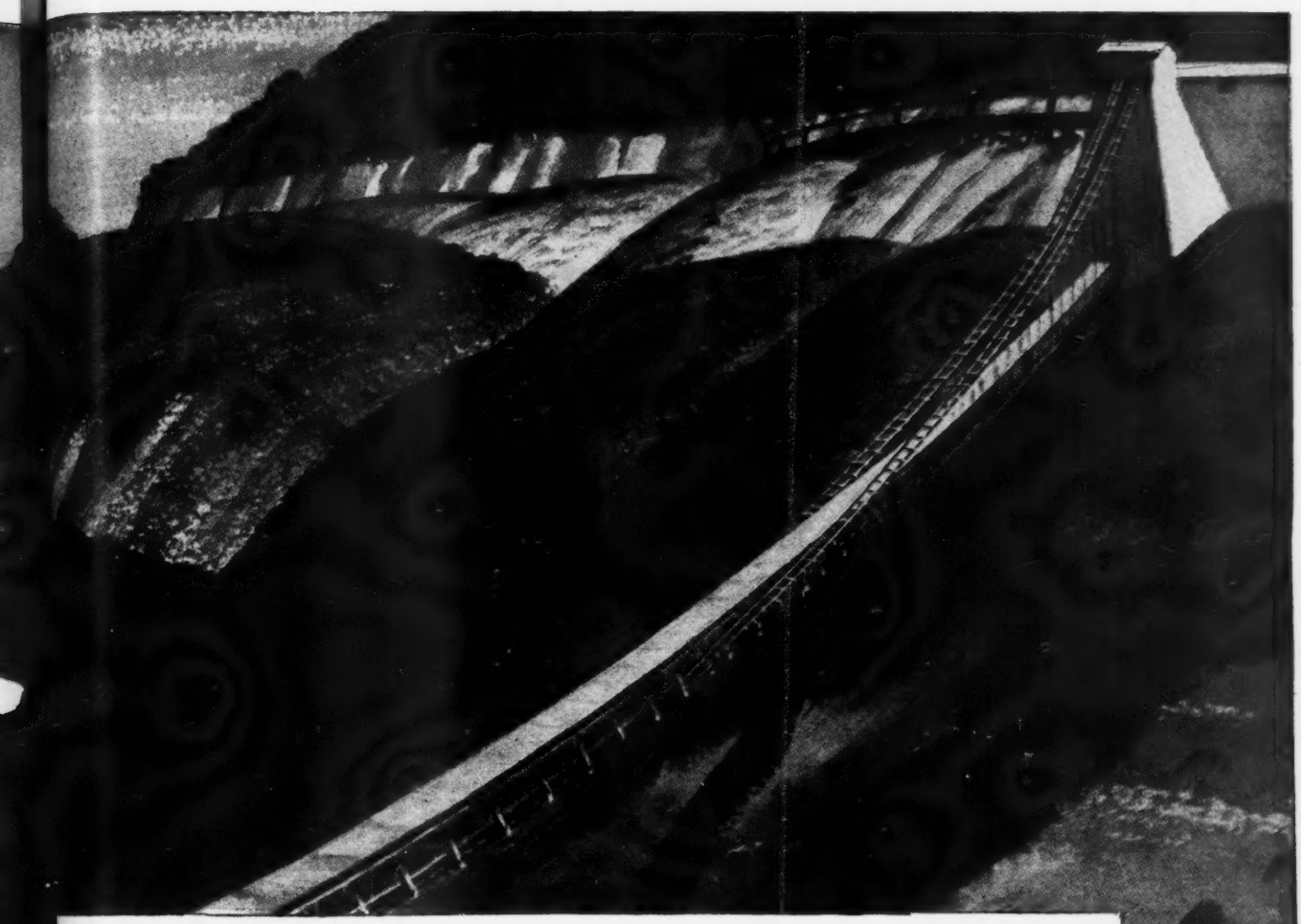
That is why Bethlehem engineers have devoted particular effort to developing the proper ropes for dragline service. Such items as lay, core, abrasion-resistance, fatigue - resistance, and flexibility have been given intensive study. Naturally, the same sizes and constructions are not suitable for every rope on a dragline machine; but the important part is, Bethlehem makes it possible for you to get the *right* rope . . . whether it's for the drag line itself, or the hoist and boom lines.

When buying ropes for stripping machines, insist on Purple Strand (Bethlehem's best). And for those applications needing a highly flexible rope . . . such as your hoist line, for instance . . . make it Purple Strand Form-Set*.

**Form-Set means "preformed" in Bethlehem wire-rope language. And "preformed" means easy handling . . . bendability . . . longer life.*

When you think WIRE ROPE
. . . think BETHLEHEM


Air Express
THROUGH COORDINATED ENGINEERING



An aerial short-cut to get coal from a hillside surge bin to a tipple, 594 feet distant across a valley, was decided on by the engineers in charge of operations at this Kentucky mine.

In planning this unusual installation, they called in designers of mechanical equipment and also United States Rubber belting engineers.

This three-way team worked together in developing a suspended conveyor system which has proved highly successful.

The 48-inch U. S. Rubber Belt installed was specifically engineered for the job. In descending from the mine to preparation plant it develops power which is returned to the line.

Coordinating efforts with those of mine operators and equipment manufacturers is the rule with United States Rubber Company technicians on all conveyor belt installations. Broad experience in fabricating all types of belts, enables them to give you the expert service such important equipment deserves.

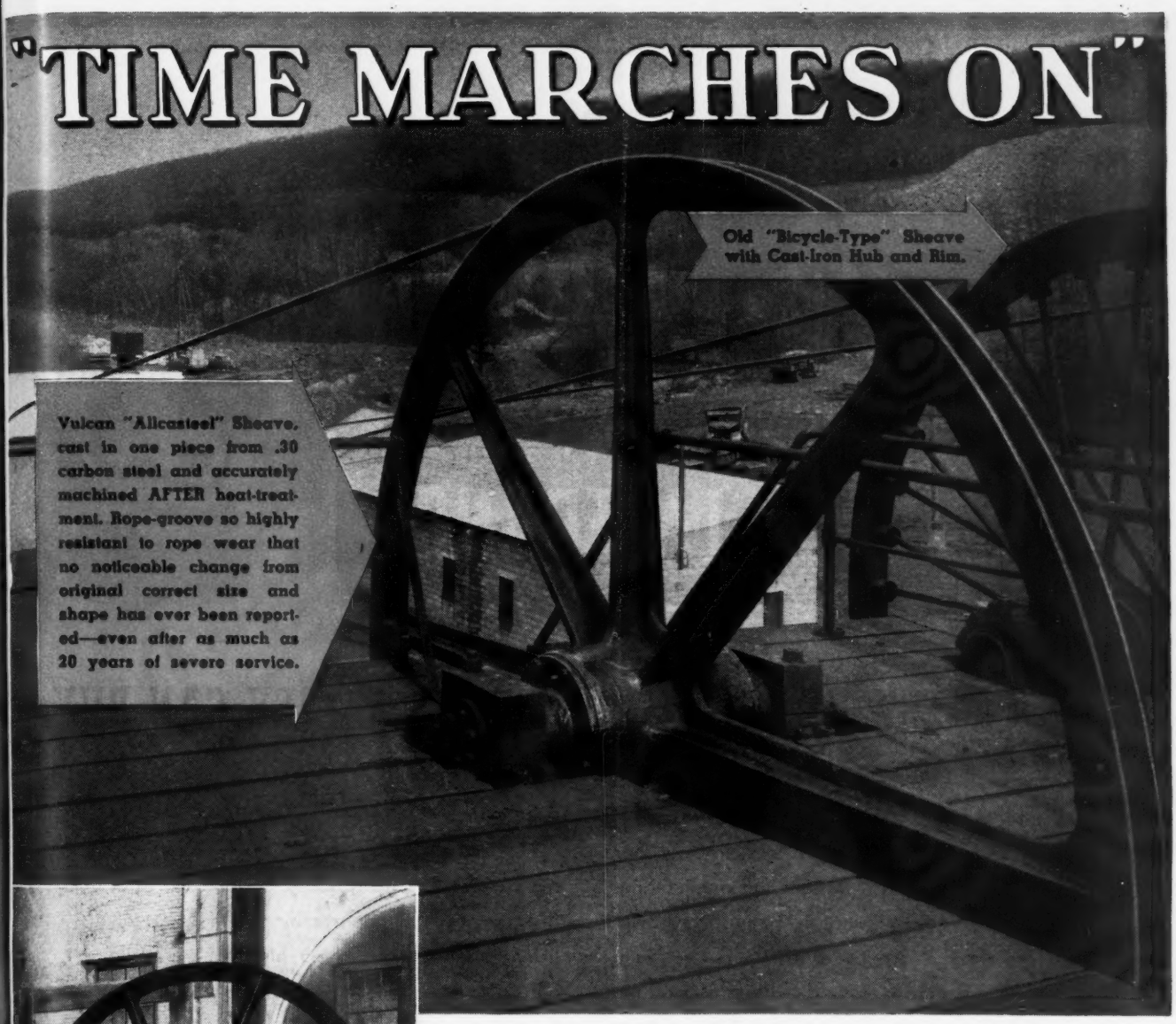
Serving Through Science

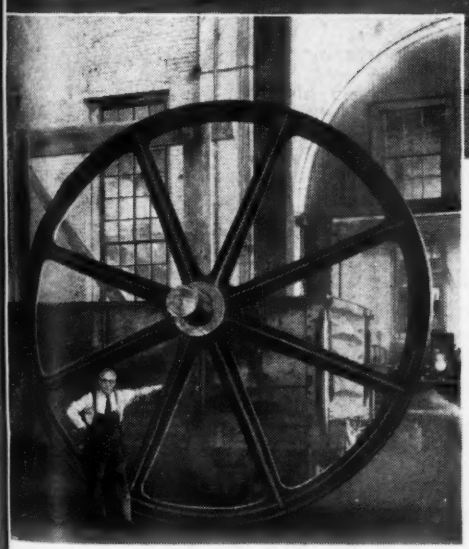
UNITED STATES RUBBER COMPANY

1230 SIXTH AVENUE, ROCKEFELLER CENTER, NEW YORK 20, N. Y.

WALWORTH
valves and fittings
DISTRIBUTORS IN PRINCIPAL CENTERS
THROUGHOUT THE WORLD
SINCE 1842 Walworth has continuously manufactured valves and fittings for every need. Its complete line of products includes:
STEEL VALVES: Made in all styles and sizes for pressures up to 5000 psi OWG — 1500 psi Steam at 950F.
BRONZE VALVES: Gate, Globe, Angle and Check types for services up to 3000 psi OWG — 300 psi Steam at 500F.
LUBRICATED PLUG VALVES: Plain and ball-bearing types, ½" to 24", for pressures from 125 to 5000 psi and vacuum.
FITTINGS: A complete line in steel, bronze, and iron. Screwed, flanged, and welding ends.
WALSEAL* VALVES AND FITTINGS: For making threadless Silbraz* joints on copper or brass pipe or tubing.
* Reg. Trade Marks
PIPE WRENCHES: Three types—Walco, Walworth Genuine Stillson, and Parmelee—each one strong, simple and dependable.
ARMY E NAVY
12 AWARDS TO 4 PLANTS
For a detailed description of Walworth products, write on your company letterhead for free copy of Catalog 42. Address the Walworth Company, 60 East 42nd St., New York 17, New York.

"TIME MARCHES ON"


Old "Bicycle-Type" Sheave with Cast-Iron Hub and Rim.
Vulcan "Allcasteel" Sheave, cast in one piece from .30 carbon steel and accurately machined AFTER heat-treatment. Rope-groove so highly resistant to rope wear that no noticeable change from original correct size and shape has ever been reported—even after as much as 20 years of severe service.



One of the six 14-ft. diameter Vulcan Allcasteel Sheaves recently furnished to a large metal-mining company.

MINING men are usually ultra-conservative—probably because precious lives so often depend upon the accuracy of their decisions. But "time marches on" and improved equipment gradually wins acceptance on its demonstrated merit.

Acceptance of Vulcan Allcasteel Sheaves came slowly at first but has gained momentum so consistently that our list of "Repeat" users now includes a large percentage of the leading companies in both the coal and metal mining fields. Light, strong and highly resistant to rope wear, they have thoroughly proved their money-saving superiority for every type of heavy-duty service. Available in any size—for either vertical or horizontal mounting—with either plain or anti-friction bearings.

VULCAN IRON WORKS

Established 1849

Main Office and Works WILKES-BARRE, PA., New York Office 50 Church St.

Heavy-Duty Electric Hoists
Self-Contained Hoists
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LA FRANCE

THE FINEST HEAVY-DUTY TRUCKS MONEY CAN BUY

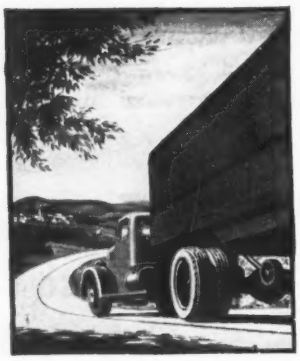
For over twenty-five years, Ward LaFrance has been building a traditionally fine line of heavy-duty motor trucks. Each successive year has brought advances in design and engineering. Today's Ward La France is better than ever.

The finest Ward LaFrance trucks ever built are now serving the United Nations all over the world. They are the huge, type M-1 Heavy Duty Wreckers which have compiled an unbeatable record for stamina and dependability.

Postwar Ward La France trucks and over-the-road tractors, both gasoline and Diesel, offer fleet owners the opportunity for the most efficient hauling in trucking history . . . Write our Sales Department for the Ward La France fleet-owner plan.

FRANCHISES AVAILABLE

Progressive, merchandising-minded concerns eager to expand their profit possibilities by broadening their market potentials, would do well to consider the fertile, heavy-duty truck market. Investigate the profit potential in the Ward LaFrance line . . . Our Sales Department will be happy to supply information about available franchises.



WARD LAFRANCE

TRUCK DIVISION

GREAT AMERICAN INDUSTRIES, INC.

ELMIRA, NEW YORK

Now...Nylon-Insulated Wires and Rubber Plug Closures on all Du Pont Electric Blasting Caps

Here's news . . . the entire line of Du Pont Instantaneous and Delay Electric Blasting Caps is now equipped with nylon-insulated wires and rubber plug closures. These outstanding improvements make Du Pont Electric Blasting Caps better and safer than ever:

1. Nylon-Insulated Wires—Reduce misfires resulting from current leakage. Vivid contrasting colors increase visibility . . . minimize the possibility of error in hooking up.

2. Rubber Plug Closures—Assure maximum water resistance . . . permit use of shorter cap shells . . . make priming easier, safer.

These improvements, products of Du Pont research, represent the greatest advance in electric blasting caps in half a century. Your Du Pont Explosives representative will gladly show you samples of these new caps. Be sure to see them.

E. I. du Pont de Nemours & Co. (Inc.), Explosives Department, Wilmington 98, Delaware.

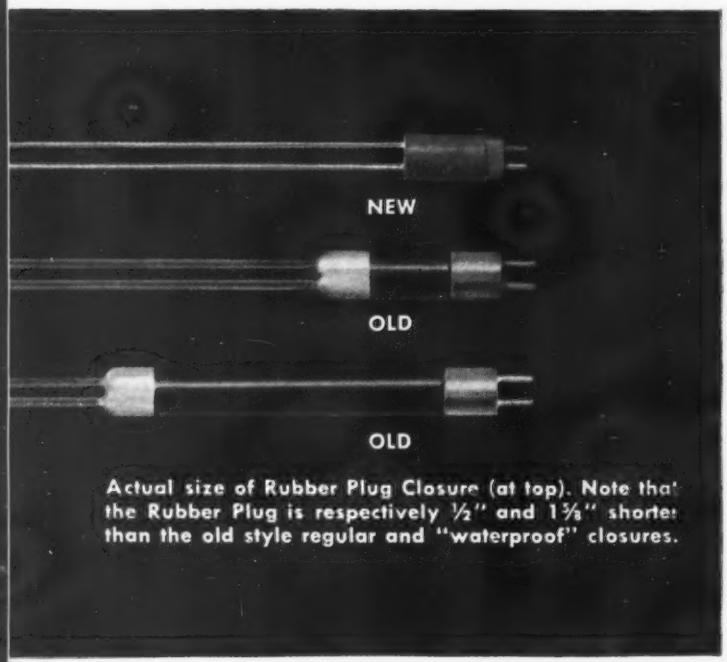
DU PONT EXPLOSIVES

BLASTING SUPPLIES AND ACCESSORIES

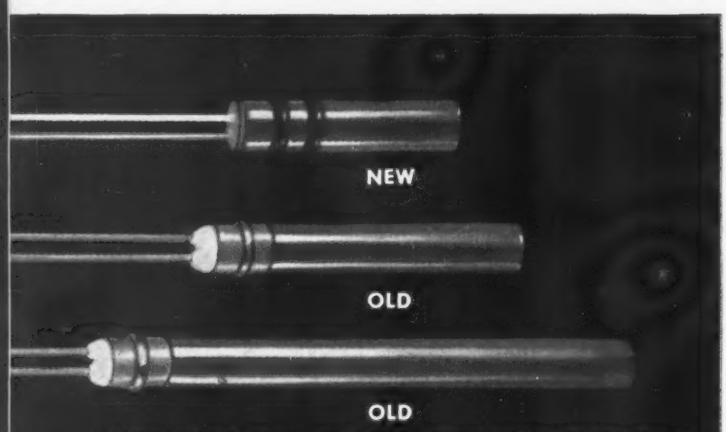
DU PONT

REG. U.S. PAT. OFF.

These exclusive features . .



Actual size of Rubber Plug Closure (at top). Note that the Rubber Plug is respectively ½" and 1⅝" shorter than the old style regular and "waterproof" closures.



Actual size of improved Instantaneous Electric Blasting Cap (at top) compared with old type regular and "waterproof" caps (center and bottom.) The new cap is shorter by ½" and 1⅝" respectively.

Actual size of an improved First Delay Electric Blasting Cap compared with its older counterpart. The new cap is $1^{3}/_{16}$" shorter than the old type. The same difference in length is maintained through all periods.

make Du Pont Electric Blasting Caps safer and better

● Today, when increased production is s vital to the war effort, two important im provements in Du Pont Electric Blasting Cap are helping industry do the job faster an safer. Here are the details:

Nylon-Insulated Wires—Nylon plasti wire covering is tough and abrasion-resistan . . . and it is not affected by extreme or rapi changes in temperature. It is equal to enam insulation in preventing current leakage . . yet, when necessary, it is readily removed fo making connections. Nylon-insulated wire are clean to handle and resist kinking. Bril liant colors make them easy to see.

Rubber Plug Closures—These plugs, dou ble crimped in the shells, replace the forme combination of bridge plug, asphaltic wate proofing compound and sulfur seal. Thi allows a substantial reduction in shell lengt without any reduction in explosive strength Shorter shells make priming easier and th loading of primers safer. Rubber plug cap have far greater water resistance than ol style, asphalt-sealed "waterproof" caps . . and their performance is not affected by ex tremes of temperature.

These exclusive features make Du Pon Electric Blasting Caps more dependable than ever. *And the most dependable detonators ar the safest detonators.* So don't run the risk of misfires . . . use Du Pont Caps.

E. I. du Pont de Nemours & Co. (Inc.), Explo sives Department, Wilmington 98, Delaware.

• • •

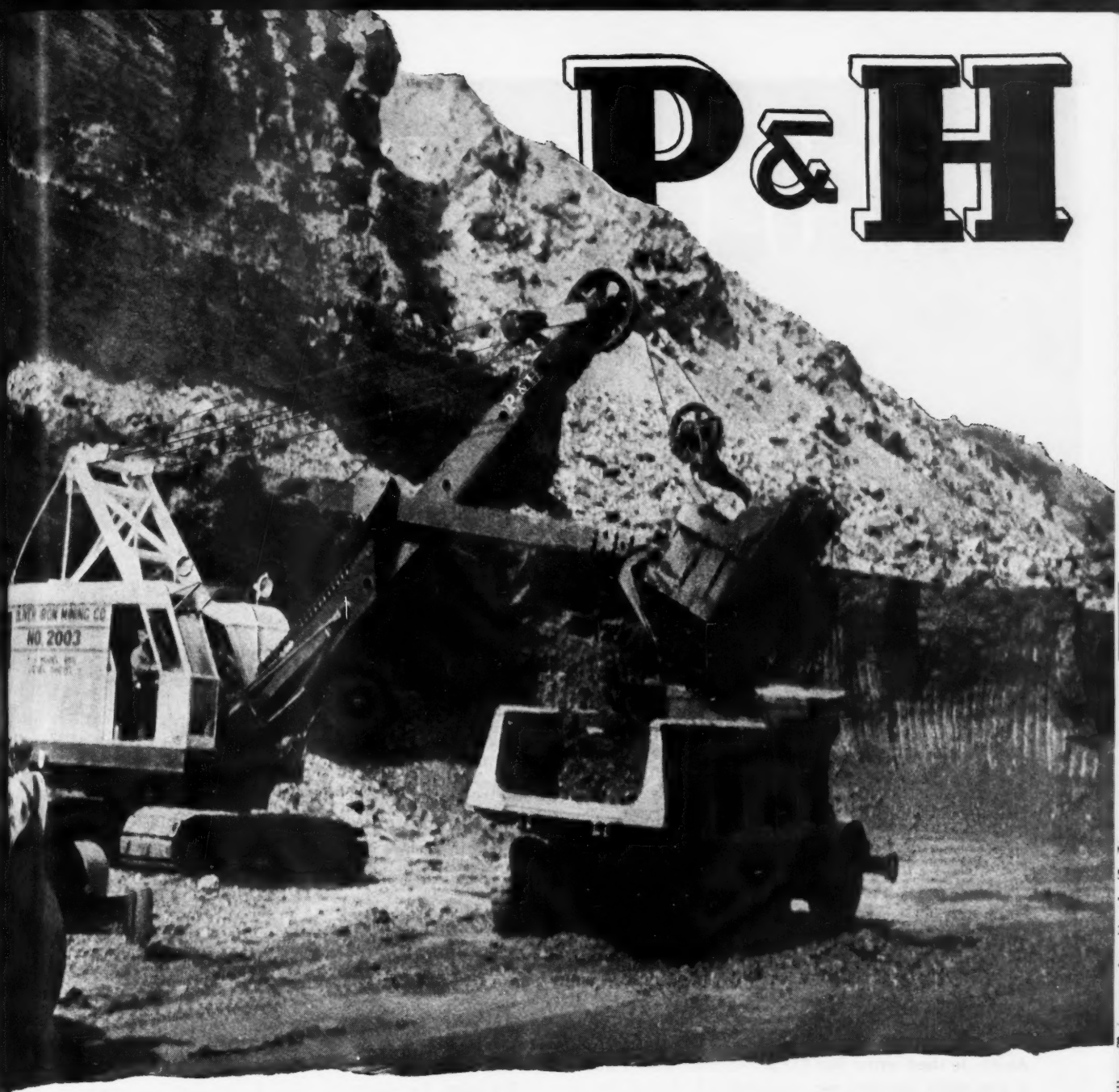
Note: Nylon and rubber are allocated for the above described purposes by the War Production Board.

DU PONT EXPLOSIVES

BLASTING SUPPLIES AND ACCESSORIES

DU PONT

REG. U.S. PAT.



Expect These Things From P&H

OOTH PERFORMANCE. From smooth-rolling ers, operating on the true roller-chain principle, om point sheave... in every detail of design, these are built to reduce friction and eliminate strain.

Y OPERATION. Smooth, responsive hydraulic ol. Here's swift, velvety action that is easier on achine, easier on the operator.

G LIFE. All-welded construction of rolled-alloy ... more rigid, more rugged. No bolts or rivets k loose or shear; no "weaving" to let machinery t of alignment. It means fewer repair bills, too.

D VALUE. Many of P&H's exclusive refinements have been withheld. But they are included because they save *you* time and money in the long run. P&H's added values protect your investment in excavating equipment. Ask for the proof!

General Offices:
4540 W. National Avenue, Milwaukee 14, Wisconsin

P&H Excavators are built in sizes up to 6 cubic yards capacity with gasoline, Diesel or electric power. Write for literature.

P&H EXCAVATORS
HARNISCHFEGER CORPORATION
EXCAVATORS · ELECTRIC CRANES · ARC WELDERS · HOISTS · WELDING ELECTRODES · MOTORS

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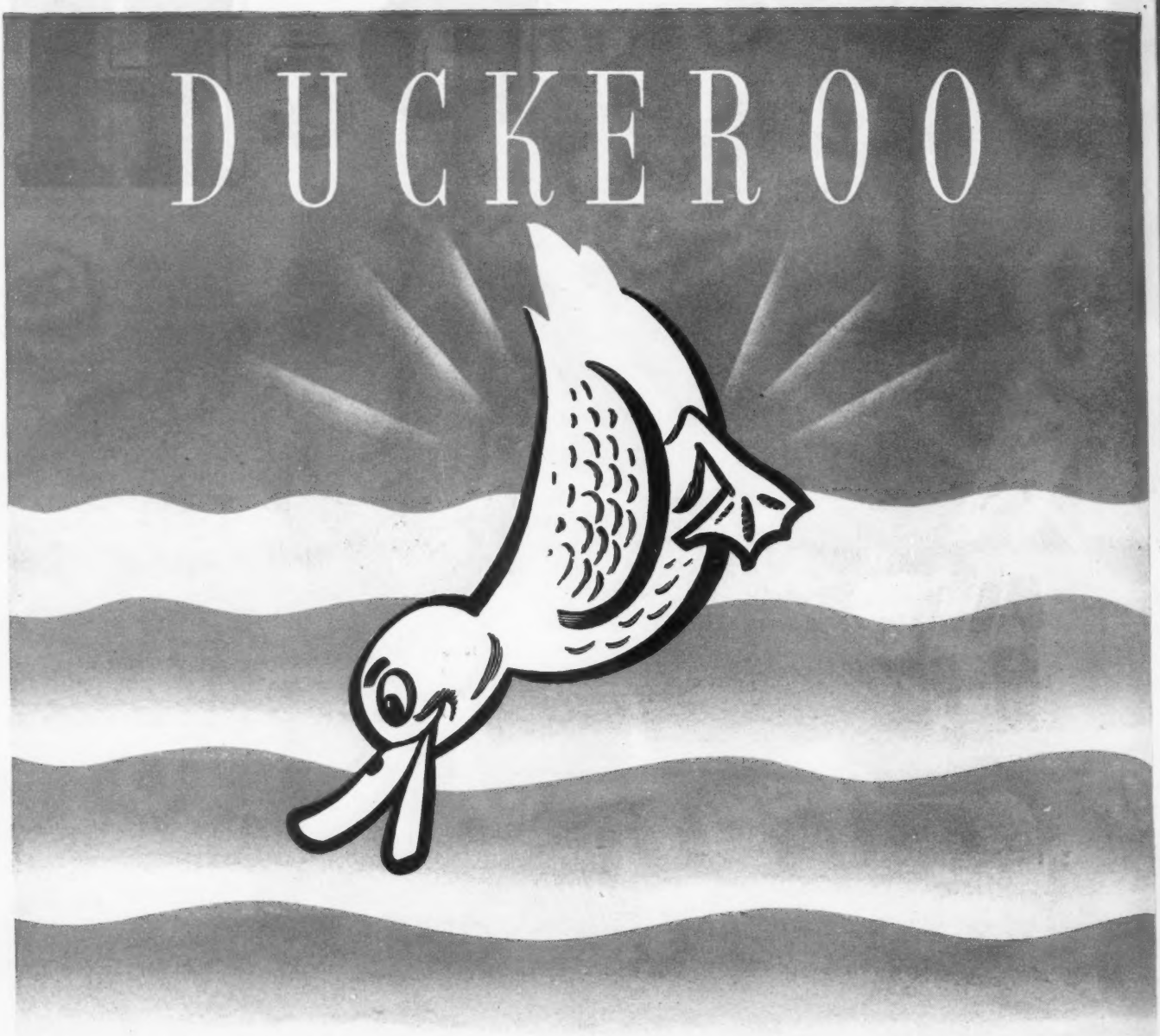

Ability to shed water like the proverbial "duck's back" is one more demand we make of U.S. Royal Mining Machine and Locomotive Cables.

The insulating sheath must be 100% impervious to penetration by moisture, so that leakage and short circuits will be prevented. Therefore U.S. Royal Cords and Cables are immersed in a water bath for hours, then checked for circuit integrity. In plant talk, we give it the old "Duckeroo".

This is just one of six gruelling tests. Others are trial by heat, by sub-zero cold, by impact, compression, stretch and bend. That is why U.S. Royal Cords and Cables always give satisfaction.

You can specify U.S. Royal Mining Machine and Locomotive Cables with absolute confidence if you want balanced construction, flexibility, high dielectric strength, smoothness of finish and long, trouble-free service.

THE NEW U. S. ROYAL *Safety Tested*

MINING MACHINE AND LOCOMOTIVE CABLES

Listen to "Science Looks Forward"—new series of talks by the great scientists of America—on the Philharmonic-Symphony program. CBS network, Sunday afternoon, 3:00 to 4:30 E.W.T.

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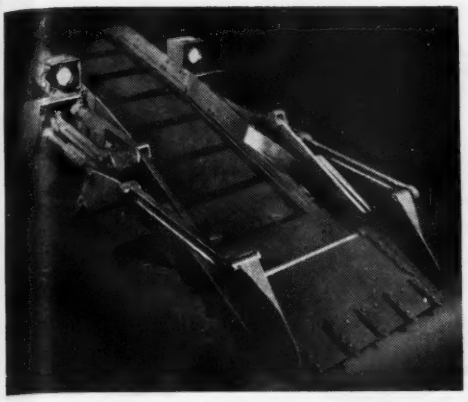
In Canada: Dominion Rubber Co., Ltd.



"LITTLE DROPS OF WATER, LITTLE GRAINS OF SAND—

The loader with the natural, smooth, easy shovel-action loading head

—make a mighty ocean and a mighty land."

We are reminded of these lines when we think of the hundreds of closely supervised details that go into the building of the mighty Whaley "Automat". For, it is perfection in these details—down to the smallest part—that gives the "Automat" mechanical loader its ability, stamina, and "guts" to stand up and produce todays maximum tonnage in coal and whole seam mining, slate or heavy rock loading.

Uninterrupted service is dependent upon each of the big and little parts standing up, doing its individual job perfectly. This is the reason why we have always controlled strict supervision in manufacture of every mechanical part that makes up the famous Whaley "Automat".

This close supervision in every detail is responsible, in a great measure, for the low maintenance cost of the "Automat". It is this painstaken perfection in engineering that has made the "Automat" so outstandingly successful. It is the reason mines are able to use the "Automat" in triple shift service with so little maintenance.

When you write for literature and information regarding the Whaley "Automat", please mention your conditions. Myers-Whaley Co., Knoxville 6, Tenn.

• • •

Wm. Neill & Son, Ltd., St. Helen's Junction, Lancashire, England, are licensed for manufacture and sale in Great Britain and Europe.

Shown below are a few Whaley "Automat" parts, in the making.

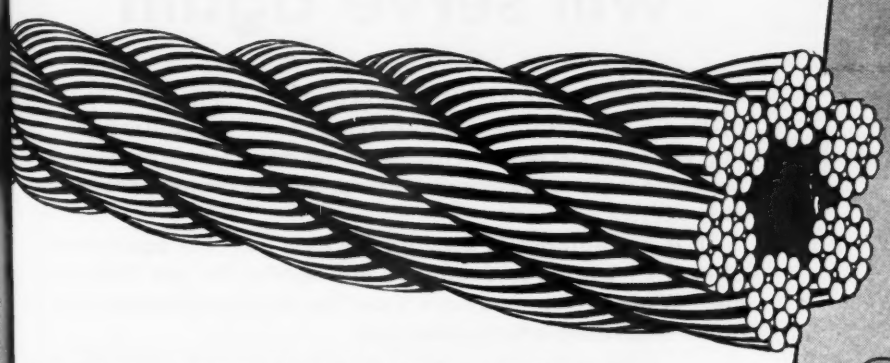
MYERS-WHALEY *Mechanical Loaders Exclusively For Over 37 Years*

ROE

FOR TOUGH MINING JOBS

...CHOOSE WIRE ROPE

BLING



FOR THE LONG PULL!

ON SHAFT HOISTS OR INCLINED PLANES, in stripping or excavating equipment, efficiency depends on wire rope that has the capacity to *deliver*... day in and day out. That's why, when the heat's on to meet production schedules, you can have confidence in Roebling "Blue Center" Wire Rope. Its all-around, built-in *quality* makes it ideal for tough mining jobs.

Precision-engineered...to combine strength and flexibility with fatigue-and-abrasion resistance to best advantage for the job, Roebling "Blue Center" Wire Rope reduces maintenance problems, expensive stoppages . . . and operation costs.

And remember that Roebling, with a century's background of wire specialization, can help you choose the *right rope for your job.* Check with our nearest branch office, and get started on the way to increased output from your rope-rigged equipment. Our wire rope engineers are always at your service.

JOHN A. ROEBLING'S SONS COMPANY

TRENTON 2, NEW JERSEY

Branches and Warehouses in Principal Cities

WIRE ROPE AND STRAND • FITTINGS • SLINGS
ELECTRICAL WIRES AND CABLES • COLD ROLLED STRIP
WIRE CLOTH AND NETTING • SUSPENSION BRIDGES AND CABLES • HIGH AND LOW CARBON ACID AND BASIC OPEN HEARTH STEELS • ROUND AND SHAPED WIRE • AERIAL WIRE ROPE SYSTEMS • AIRCORD, SWAGED TERMINALS AND ASSEMBLIES

PACEMAKER IN WIRE PRODUCTS

QUESTIONS AND ANSWERS

Q What is meant by the designations of 6x7, 6x19, 8x19 and 6x37 rope?

A *Each of the above designate a particular group or classification of wire rope: the 6x7 rope contains 6 strands of 7 wires each, whereas the 6x19 rope contains 6 strands with from 16 to 25 wires per strand. The 8x19 rope contains 8 strands with from 16 to 25 wires per strand, while the 6x37 rope contains 6 strands having from 26 to 46 wires per strand.*

Q How do the above groups or classifications of ropes compare as to abrasion resistance and flexibility?

A *The 6x7, 6x19, and 6x37 ropes are rated as listed with respect to abrasion resistance, the 6x7 having the greatest resistance to abrasion. The flexibility of these ropes follow in the same order with the 6x7 having the least flexibility.*

Q Why are so many different constructions of wire rope used?

A *Since practically every type of installation on which wire rope is used is either dissimilar with respect to equipment or operation, a good number of different constructions of rope are necessary to obtain maximum rope service.*

WHEN THE INDUSTRIAL GIANT RETURNS TO CIVILIAN PRODUCTION

GAR WOOD

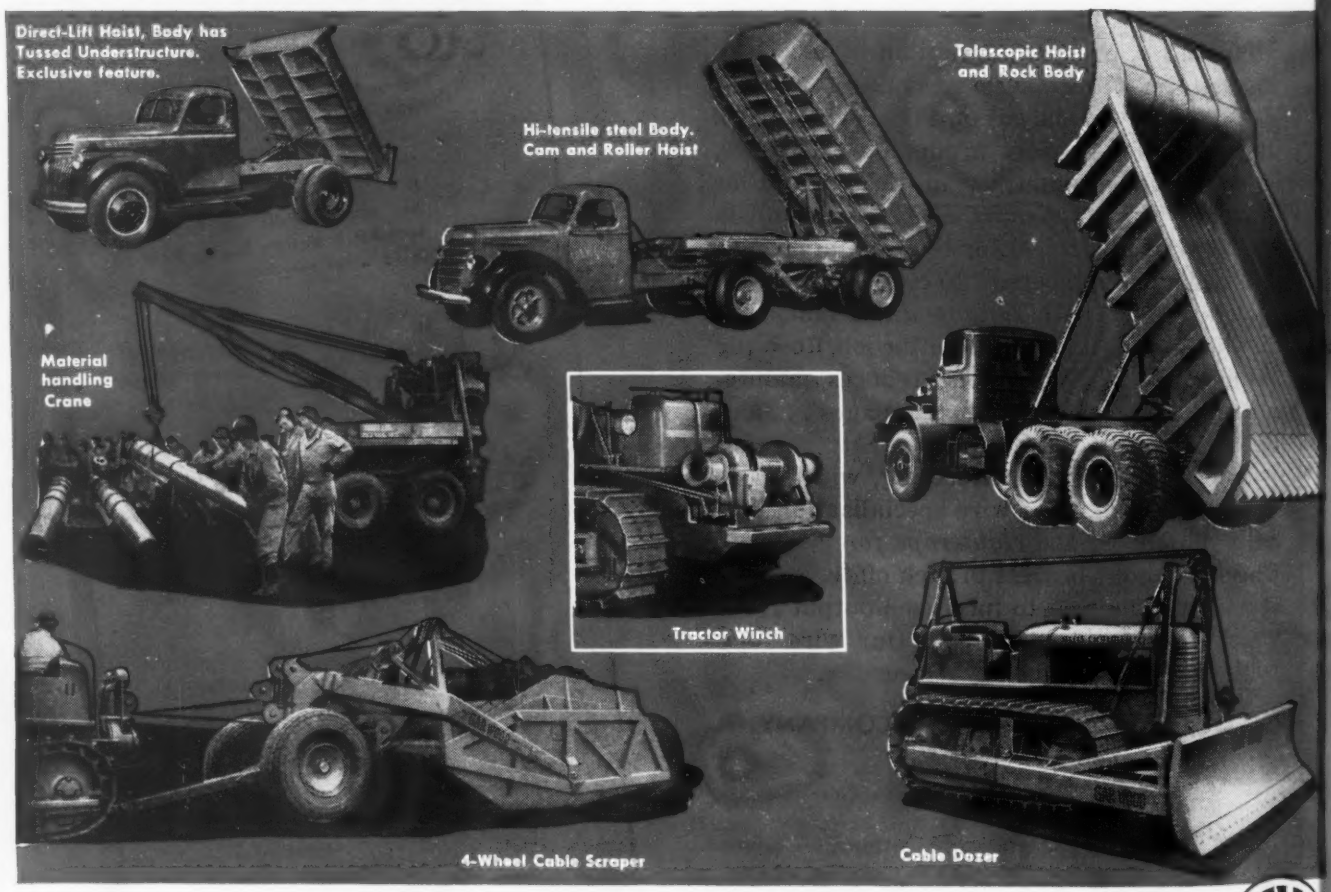
Specialized Equipment

will serve again

Gar Wood equipment is "slugging it out" with the enemy on all fronts . . . performing a hundred and one specialized jobs that are a part of modern industrial warfare. Gar Wood engineers are experts in designing equipment for rugged, dependable service.

It is our purpose to produce the best possible equipment of war in whatever quantities are needed by our fighting men. When Victory has been won, Gar Wood equipment will again be available for civilian use.

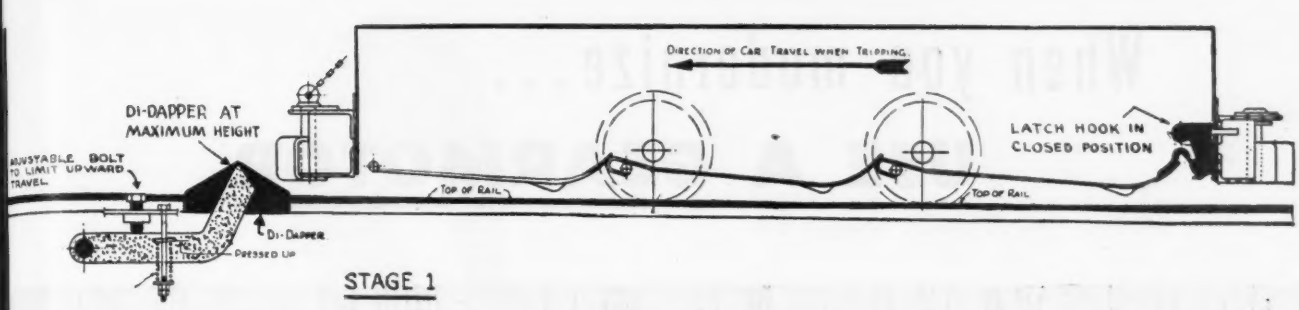
BUY U. S. WAR BONDS TO ASSURE EARLY VICTORY


Direct-Lift Hoist, Body has Tussed Understructure. Exclusive feature.
Hi-tensile steel Body. Cam and Roller Hoist
Telescopic Hoist and Rock Body
Material handling Crane
Tractor Winch
4-Wheel Cable Scraper
Cable Dozer

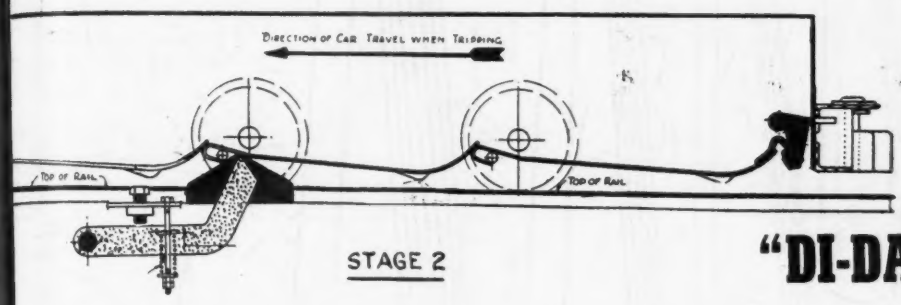
GAR WOOD INDUSTRIES, INC.

DETROIT 11, MICH.

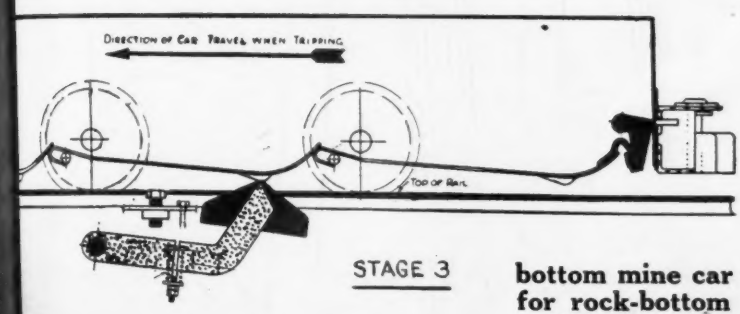
HOISTS AND BODIES, WINCHES AND CRANES, TANKS, ROAD MACHINERY, HEATING EQUIPMENT, MOTOR BOATS



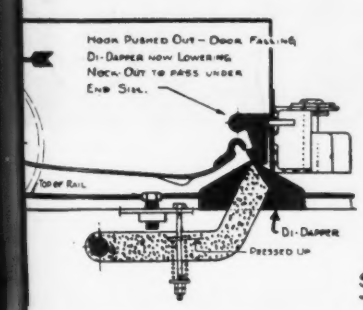
STAGE 1



STAGE 2



STAGE 3



STAGE 4

Our "DI-DAPPER NOCKOUT" —have you heard about it?

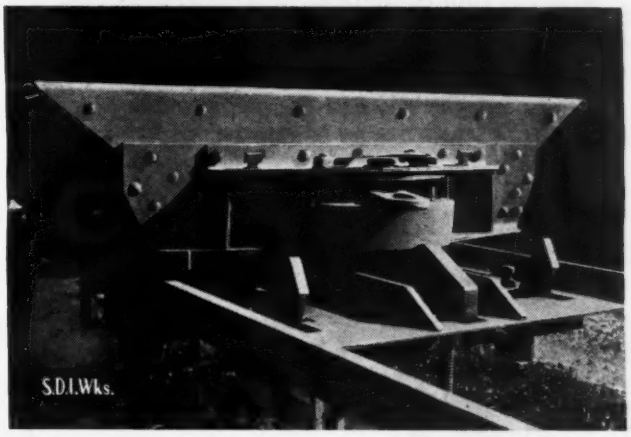
★ Our new "Di-dapper-Nockout" is an improvement that, we are sure, makes the S-D 1-2-3 Automatic drop-bottom mine car more essential than ever to any coal mine for rock-bottom production cost.

This improved unlatching device is faster, more foolproof, eliminates all manual labor entirely at storage bin. The conventional latch-lever arm which had to be raised by hand, or by some mechanism alongside the track, has been done away with. Only a small, emergency dumping device remains on end of car. The trouble of damaged lever arms, caused by one car riding another, or other accidental causes, has been eliminated.

Two automatic "Di-dapper Nock-outs", at the bin, unlatch the two independently-operated catches underneath the cars. Actual use in mines for over two years has proved the great value of this new invention.

We would like to give you names of mines using the S-D "Automatic" and the "Di-dapper Nock-out". Write us for them and let the operators, themselves, tell you the details.

★ *The drawings above illustrate the S-D automatic Di-Dapper Nockout mechanism as it passes under a S-D 1-2-3 Automatic Drop-Bottom Car having three doors. Stage 1 shows the Di-Dapper mechanism just before the forward bumper depresses it. Stages 2 and 3 show the mechanism passing gently underneath car at different points. At Stage 4, the mechanism automatically rises (by the action of compressed spring) to a point where it engages the forward faces of the door-supporting latch hooks. Each car has two such mechanisms, and each mechanism automatically comes into contact with one of the latch hooks and forces it back positively into its unlatched position. Photo at right shows car just after it has passed over Di-Dapper Nockout mechanism.*



Sanford-Day Iron Works, KNOXVILLE, TENNESSEE

When you modernize...

USE A GEARMOTOR

W.P.B. indicates that we'll all be pushing war production for many months. And then the heat goes on reconversion.

Much of your equipment, running at peak load since 1941, probably needs to be replaced or modernized. Whichever you need . . . replacement or modernization . . . use a gearmotor when the drive requires speed reduction. Here's why.

A gearmotor is the most efficient means of speed reduction available today. It's more compact . . . lasts longer with less maintenance . . . is easier to install . . . lower in over-all cost . . . and safer for your employees. These advantages are not idle claims . . . for they've been proved in actual industrial installations.

Westinghouse offers a complete line of gearmotors for any speed reduction application from 1 to 75 hp. Each unit is specifically designed to conform to industry-wide A.G.M.A. standards. Each new unit contains many improved exclusive design features. Call your nearest Westinghouse office for details. Westinghouse Electric & Manufacturing Company, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-07227

Westinghouse Gearmotors

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

Four out of five drives need speed reduction

What makes this Upson-Walton Wood Block a Better Wood Block?

THE wood block is the earliest form of tackle pulley block. Centuries old, made originally with rope straps then with iron and finally with steel, it became a more efficient, sturdier hoisting tool as time progressed—until today, in Upson-Walton wood blocks, we have hoisting strength undreamed of by its early users.

UPSON-WALTON SHELLS ARE BEST QUALITY HARD WOOD specially chosen for strength. Wood is well seasoned, free from knots and hearts which would weaken it. This shell is unusually hard wearing and long lasting.

SHEAVES ARE MADE FROM CLOSE-GRAINED GREY IRON, hence they are stronger. Closely inspected to exclude all blow-holes, pits and other weakening inclusions.

SHEAVE RIM AND CENTER PIN ARE CONCENTRIC. Center pins are made of cold rolled steel. Unusual care is taken by Upson-Walton to insure true-running sheaves. Close tolerance between sheave bea ing and center pin results in lon er life for the bearing.

HEAVY STRAPS AND DROP FORGE CONNECTIONS of selected fine grai steel give Upson-Walton woo blocks greater strength and higher safety factor.

HEAVIER DROP-FORGED HOIST HOO *. . . not the usual and weaker roun stock type, but specially-designe heavy-duty hoist type as used cranes and heavy equipment. Pe mits greatly increased safe-workin loads.* Majority of Upson-Walto wood blocks are now equippe with this type hook.

AS WE GO TO PRESS, DELIVERIES ON ALL SIZES OF UPSON-WALTON WOOD BLOCKS ARE GOOD

ALL UPSON-WALTON WOOD BLOCKS ARE FURNISHED COMPLETE WITH BECKET

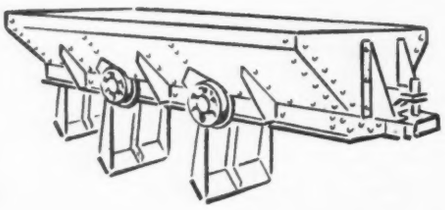
Established 1871

THE UPSON-WALTON COMPANY

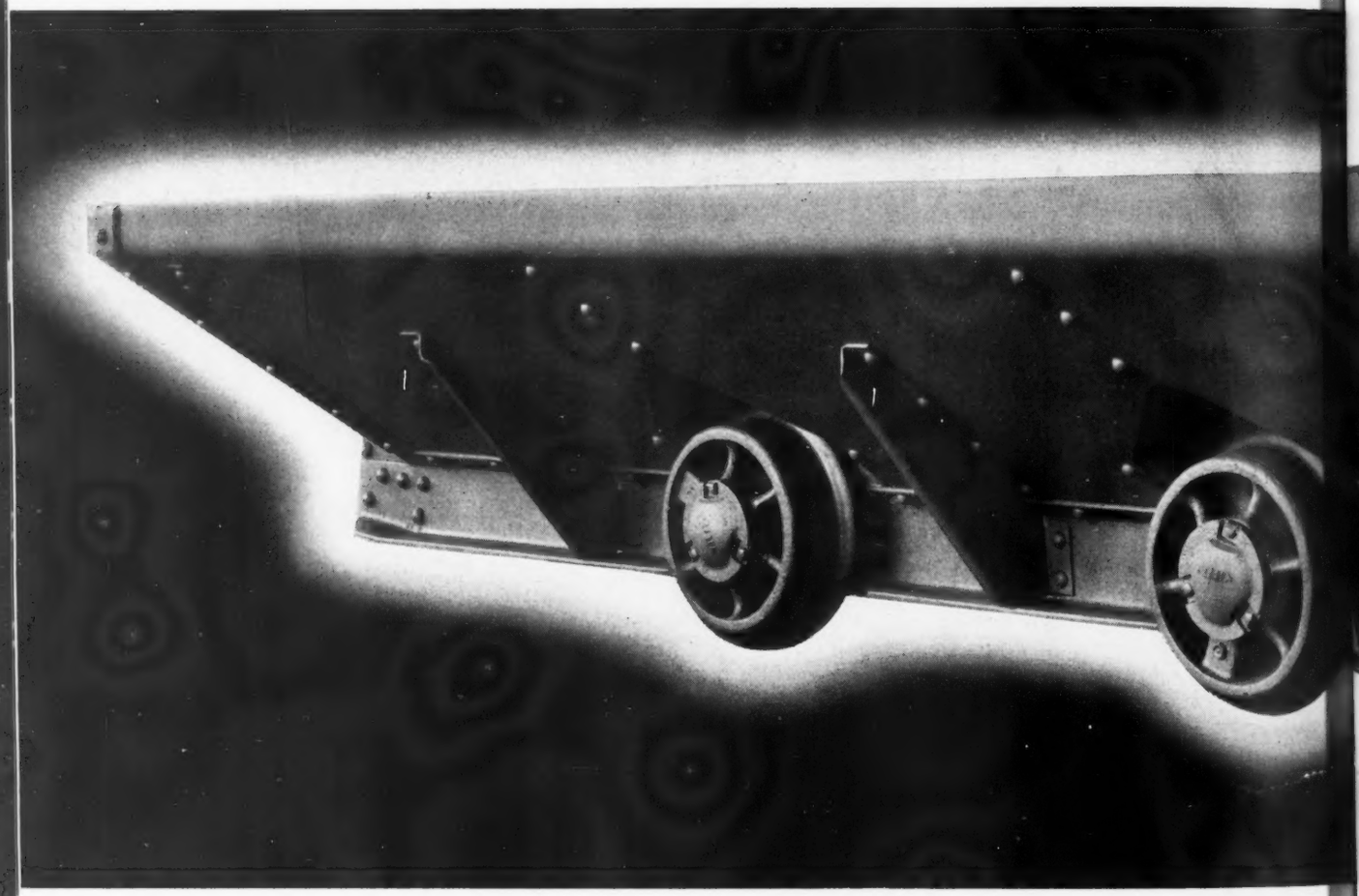
Manufacturers of Wire Rope, Wire Rope Fittings, Tackle Blocks

MAIN OFFICES AND FACTORY: CLEVELAND 13, OHIO

114 Broad Street, New York 4 — 737 West Jackson Boulevard, Chicago 6 — 241 Oliver Building, Pittsburgh 22



Operating



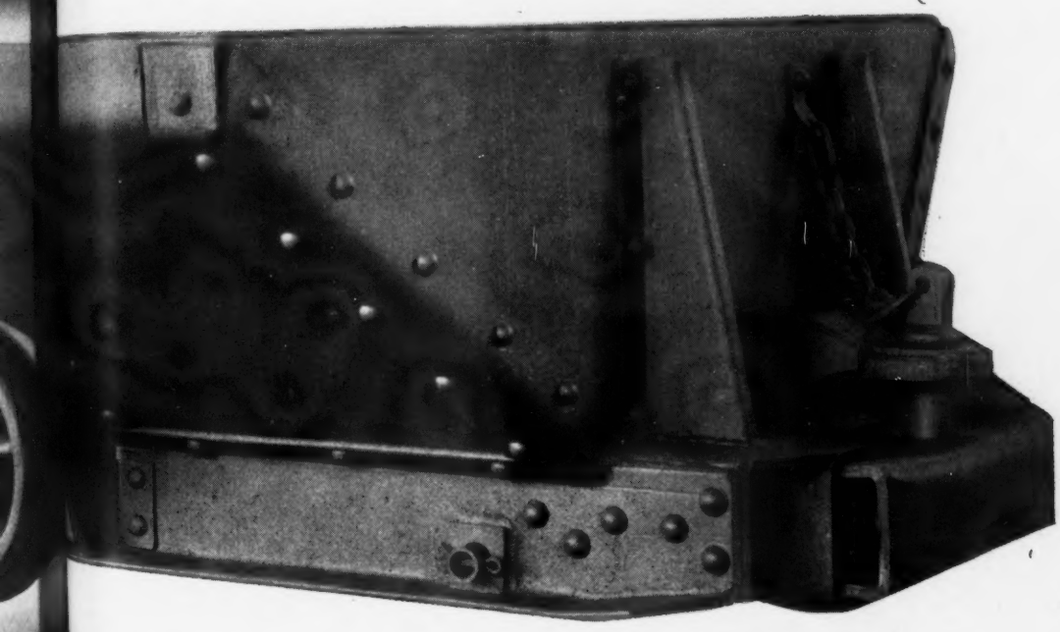
AFTER operating your equipment at high speed for eighteen or twenty-four hours every day since the beginning of the war, you no doubt are thinking of repairs or rebuilding and when the old equipment is beyond repair, then new equipment.

AUTOMATIC DROP BOTTOM MINE CARS should be one of the items for first consideration to reduce cost of coal. The reduction in cost will be most important. We will do everything possible to help you with repairs, rebuilding or improvements for increased production at lower costs.

Cars can be made to suit your operations.

Q.C.f. Chilled Tread Mine Car Wheels, as manufactured under our heat-treating process, are made from a special mixture of metals — better for mine car wheels than steel or iron, alone.

...at HIGH SPEED



a.c.f.

AMERICAN CAR AND FOUNDRY COMPANY

NEW YORK • CHICAGO • ST. LOUIS • CLEVELAND • PHILADELPHIA • BERWICK, PA. • PITTSBURGH • HUNTINGTON, W. VA.

U.S. ROYAL *CON-TRAK-TOR*
NOW STRONGER THAN EVER

A favorite off-the-road traction tire for construction jobs, strip-mining and excavating, the U.S. Royal Con-Trak-Tor is now stronger than ever. Extra-strength, extra-gauge rayon cords, safety-bonded together, give long tire life even on the *tough* jobs.

But whatever the job, today tires are scarce. Look after your present tires, keep them rolling to last safe mile. Make every tire count toward victory.

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IN EVERY SERVICE
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Listen to "Science Looks Forward"—new series of talks by great scientists of America—on the Philharmonic-Symphony program, CBS network, Sunday afternoons, 3:00 to 4:30 E.W.T.

SERVING THROUGH SCIENCE

UNITED STATES RUBBER COMPANY

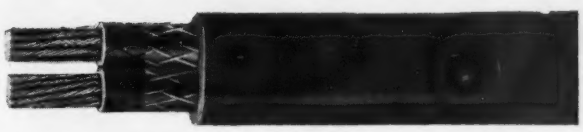
1230 SIXTH AVENUE • ROCKEFELLER CENTER • NEW YORK 20, NEW YORK

ABUSE and ABRASION *Taken in Stride* by HAZARD PORTABLE CABLES

FOR serving coal cutting machines, loaders, shovels, in fact for all electrical machinery used in mechanized mining, Hazacord Portable Cables have the extra sturdiness to meet every condition of strip mining and underground operation.

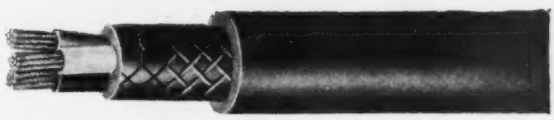
The tough Hazaprene jacket with its smooth surface resists oil, grease, heat, sunlight and corrosion due to alkalies and acids.

When dragged across rock, sand or other abrasive agents — strong, flexible Hazard Portable Cables successfully withstand mechanical abuse over long periods of service. Such resistance to destructive elements assures long cable life and effects worth-while savings in replacement costs and installation time. Hazard Insulated Wire Works, Division of The Okonite Company, Wilkes-Barre, Pa.



Hazacord Twin Parallel — Range of size: No. 8 to 2/0 AWG

Hazacord Concentric — Range of size: No. 8 to 4/0 AWG



Hazacord Three Conductor — Range of size: No. 8 AWG to 500,000 CM

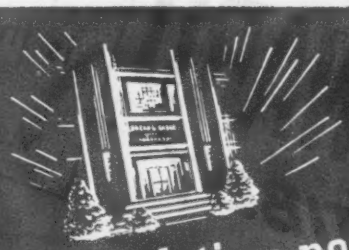
HAZARD

insulated wires and cables for every electrical use

SEARCH IN

Here, the moisture-permeability of a synthetic is tested, over a time period, under conditions equivalent to years of difficult service... one of a multitude of separate explorations.

SYNTHETICS



Here, new and surer insulating performance is the goal of a great Research Laboratory.

How most effectively to use the new materials? Which synthetic polymer is best for insulation in dampness? How improve the vulcanization of butyl rubber? How get both high tensile strength and low temperature flexibility in Buna S? . . . In the General Cable Research Laboratory, most completely equipped and manned institution in the world devoted exclusively to wires and cables, a tireless group of scientists is seeking and finding the answers to a host of urgent, practical questions. The work being done opens new vistas of product serviceability in many fields.

GENERAL CABLE CORPORATION

Manufacturers of Bare and Insulated Wires and Cables for Every Electrical Purpose

EVEN BEFORE the war, about ⅓ of all mines in this country had Mechanized below and *above* ground—because *Mechanization* reduces waste, cuts operating costs, and when carried up through the tipple—*raises product value!*

Because poorly prepared coals *cannot compete* with clean coals, of low impurity content, correct sizing, and high uniformity, leaders in this march toward *complete* Mechanization will dominate post-war markets.

Morrow Tipples *improve coal quality, raise product value, cut operating costs.* That's because Morrow *streamlines production of coal* from the mine, through most modern, efficient preparation equipment, to cars and barges, in shorter time, at lower operating costs—*in the best condition to SELL!*

Morrow engineers are available *now* to design and equip more efficient preparation plants for post-war operations. Ask Morrow to assign an engineer to study your situation. Write the Morrow Manufacturing Company, 1941 Ford Blvd., Wellston, Ohio. *Division The Wacker Corporation.*

* Better Preparation
= *INCREASED SALES!*

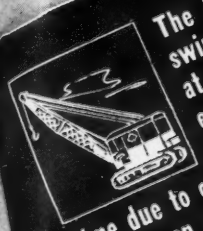
1. low impurity content
2. correct sizing
3. high uniformity

MECHANIZE WITH MORROW

COAL WASHERS • WEIGH PANS • FEEDERS • DUMPS
BINS AND BIN GATES • FLANGED LIP SCREENS
CONVEYORS • LOADING BOOMS • SHAKING SCREENS
VIBRATING SCREENS • CAR HAULS • PICKING TABLES
SETTLING TANKS • ELEVATORS • CAR RETARDERS
PERFORATED METAL SCREENS • STEEL STRUCTURES

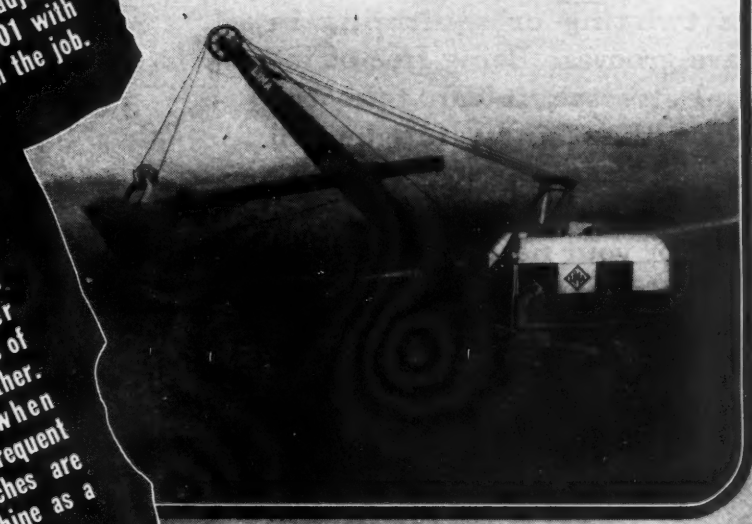
LIMA TYPE 1201 (3 and 3½ Yd. CAPACITY) SETS THE TREND FOR GREATER OUTPUT

The smooth, effortless control of the LIMA Type 1201 is made possible through air-operated clutches. This all-important feature assures greater output thru less operator fatigue. A further advantage effective thru economical operation and more economical operation and fied clutch adjustment. Only one adjustment necessary and when made, will retain the adjustment for several months. A LIMA Type 1201 with air-control means more productive time on the job.



The LIMA Type 1201 can hoist, swing, travel or boom up or down at the same time. This advantage enables the user to do a wider variety of work without the loss of time due to changing from one motion to another. This is an advantage you will appreciate when working in close quarters or where frequent moves are necessary. Independent clutches are especially desirable when working machine as a crane.

The greatest destroyer of machinery is friction. This profit taking hazard is overcome in the LIMA Type 1201 by the use of anti-friction bearings at every vital bearing point. LIMA does not stop at putting these wear resisting bearings only where high speed shafts revolve, but in the clutches, drums, cone rollers and other points where friction is commonly found. It costs less in the long run to operate a LIMA.



Regardless of how carefully a job is figured, how skillfully it is laid out, profitable results depend on the selection of the right type of equipment and its advantages to make big output possible. The LIMA Type 1201 shown in the illustration is a 3 or 3½ yard shovel (depending on length of boom and handle) or a 65 ton crane. It is in high favor with quarry operators, open-pit miners and contractors who demand top-notch performance from the equipment they buy. Look to LIMA for the shovel, crane or dragline of the right capacity for the job you are planning.

LIMA LOCOMOTIVE WORKS, INCORPORATED

Shovel and Crane Division - - - LIMA, OHIO, U. S. A.

NEW YORK, N. Y. PHILADELPHIA, PA. NEWARK, N. J. MEMPHIS, TENN. ST. LOUIS, MO.
DALLAS, TEXAS PORTLAND, ORE MASSACHUSETTS, MINN.
SAN FRANCISCO, CALIF. SEATTLE, WASH. LOS ANGELES, CALIF. SPOKANE, WASH.
MONTREAL, Quebec, Can. VANCOUVER, B. C.

★ QUARRY WORK

LIMA Cranes Shovels Draglines

Capacities CRANES 13 TONS TO 100 TONS
SHOVELS ¾ YD. TO 5 YDS. DRAGLINES, VARIABLE

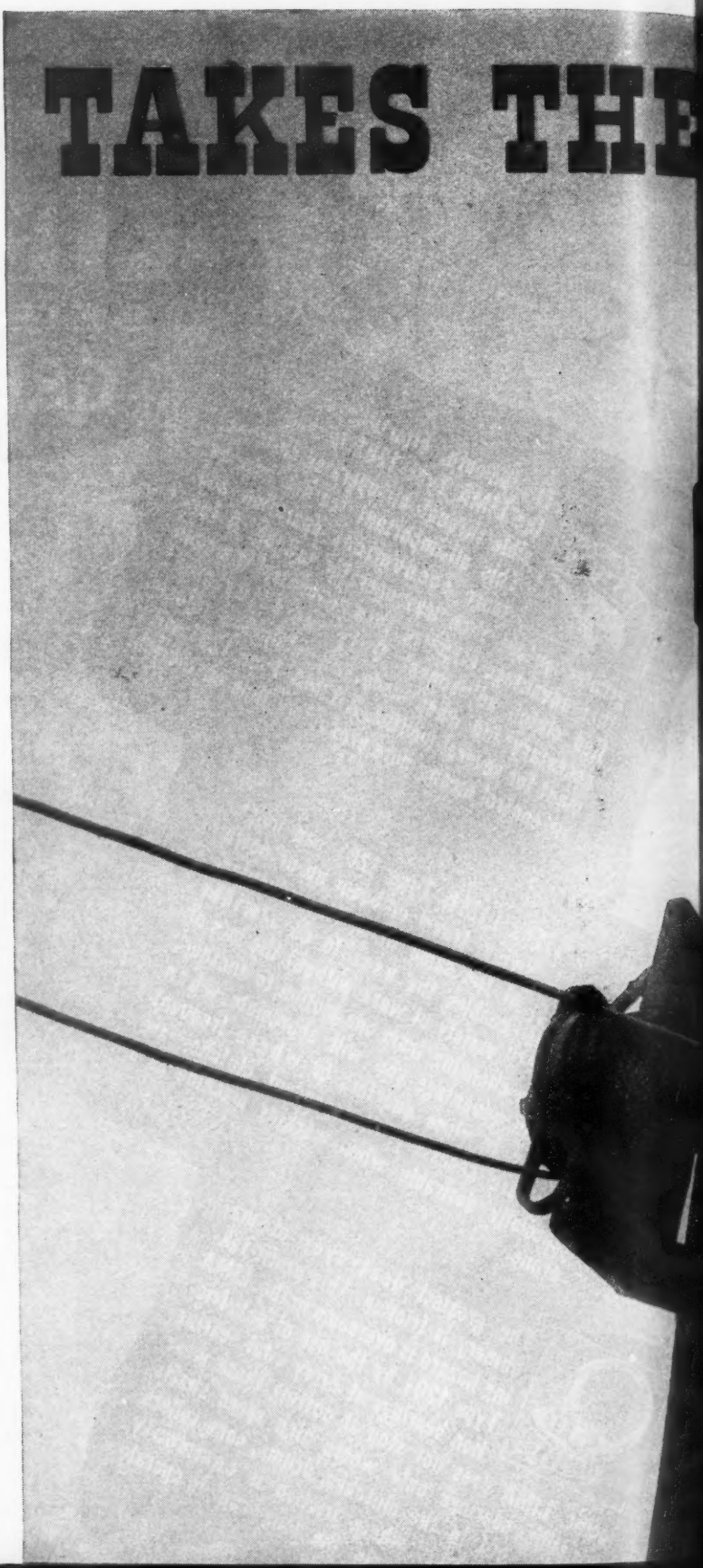
LAY·SET TAKES THE B

● Some machines are constructed with small-diameter sheaves and numerous reverse bends which are hard on wire rope. But that is exactly where Hazard **LAY-SET PREFORMED** shows up to its best advantage. Being preformed, **LAY-SET** resists twisting or squirming in sheave grooves. Being free of internal stresses, it can take the bends without undue fatigue. All around, Hazard **LAY-SET PREFORMED** is a safer, better wire rope. Specify it for your next line.

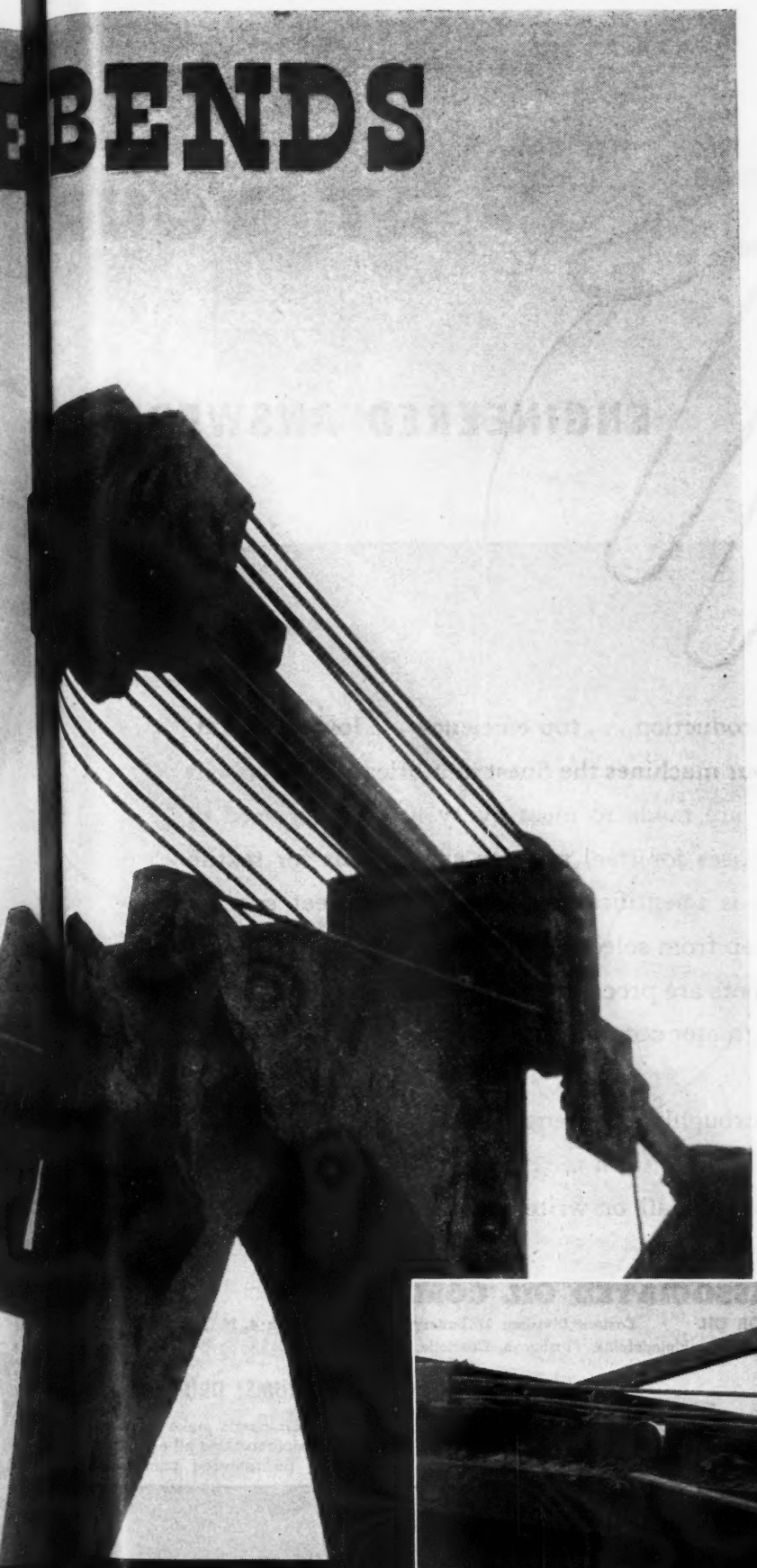
●

WILKES-BARRE, PA.
ATLANTA
CHICAGO
DENVER
FORT WORTH
LOS ANGELES
NEW YORK
PHILADELPHIA
PITTSBURGH
PORTLAND
SAN FRANCISCO
TACOMA

HAZARD WIRE ROPE DIVISION
AMERICAN CHAIN & CABLE
BRIDGEPORT



HAZARD LAY·SET *Preformed* WIRE ROPE



machines are necessarily designed
small sheaves and reverse bends.
capably withstands the punishment
imposed by such conditions.

"WELCOME TO BURMA . . . COURTESY OF THE HAIRY EARS"

"The Army Engineers are doing a big job in India. They are building a new route through Burma to replace the old road long since captured by the Japanese.

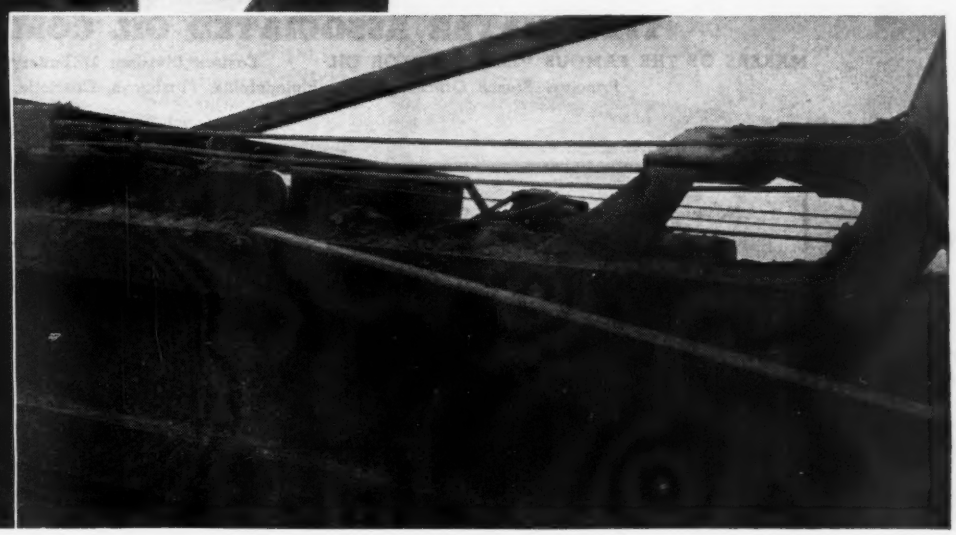
"Built as only American engineers and machines can do it, this new route crosses India's eastern border, crawls along her valleys and winds snake-like up the Himalaya slopes. It traverses malaria-infested valleys, then rises to 4,000-ft. elevations.

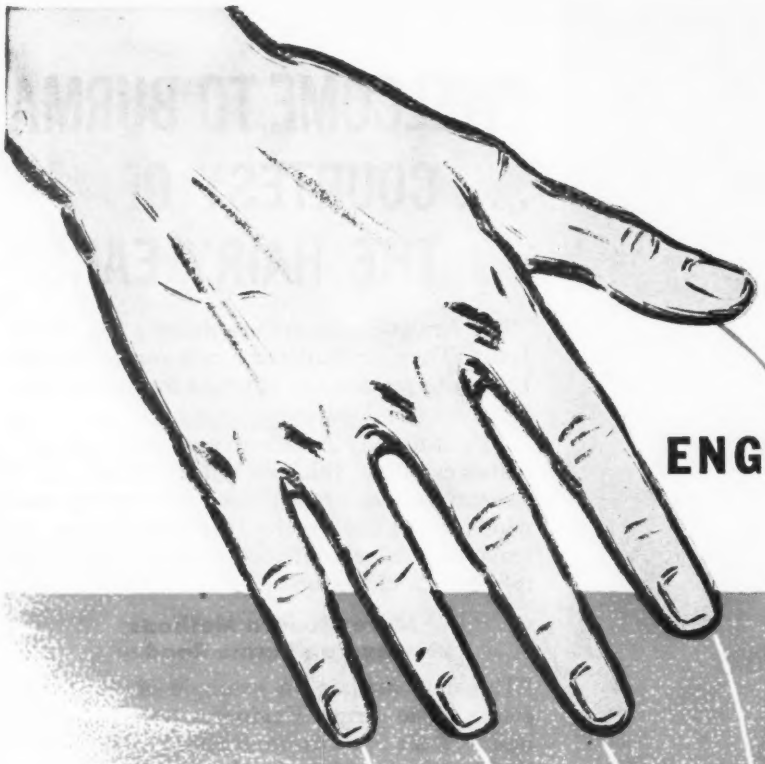
More Modern Methods than on Burma Road

"The new road is an example of American genius. The Army Engineers here put road building on a mass-production basis. When they sent a machine ahead to do one job they never let it come back over the same piece of road the second time.

"The 'Hairy Ears' moved in through the tea fields into India's Assam Province. They set up their advance camps, unloaded machinery, worked seven days a week through incessant rain and temperatures that soared to 130°,—and griped to the high heavens as good soldiers will. With grim humor one corporal named his bulldozer, with neat white letters, 'My Assam Dragon.'

"The supply of wire rope was most important, because cable-controlled machines were doing all the work. American-made preformed improved plow steel rope gave long-life through its ability to resist bending fatigue and drum crushing. These engineers found that preformed sometimes far outlasts non-preformed. Supplying it on the new Burma Road no doubt saved both time and valuable cargo space in the ships which had to transport it."





AT YOUR .

ENGINEERED ANSWERS TO EV

FOR maximum production . . . top efficiency . . . lowest operating cost, give your machines the finest in lubricants—Tycol oils and greases. Tycol lubricants are made to meet every lubrication need of industry — from roll neck greases for steel mills to spindle oils for textile plants. Each Tycol lubricant is scientifically engineered to meet specific service conditions. At every step from selection of crudes to blending of the finished product, Tycol lubricants are processed to provide maximum lubricating efficiency which means greater economy, longer machine life for every type of equipment.

Tide Water engineers are thoroughly experienced in all phases of industrial lubrication. They will be glad to assist you in selecting the Tycol lubricant best suited to your specific need. Call or write your nearest Tide Water Associated office for further details.

TIDE WATER ASSOCIATED OIL COMPANY

MAKERS OF THE FAMOUS VEEDOL MOTOR OIL • Eastern Division: 17 Battery Place, New York 4, N. Y.

Principal Branch Offices: Boston, Philadelphia, Pittsburgh, Charlotte, N. C.

Have You Received Your Copy of "Lubricania"?

This informative handbook, "Tide Water Associated Lubricania", gives clear, concise descriptions of the basic tests used to determine important lubricant properties — Viscosity, Pour Points, Neutralization Number and many others. For your free copy write to Tide Water Associated Oil Company, 17 Battery Place, New York 4, N. Y.

DRUMS! DRUMS! DRUMS!

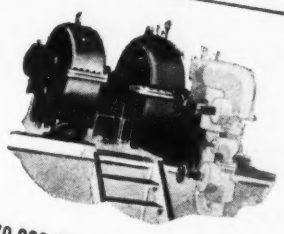
War needs make it extremely important that all empty drums be returned immediately

TYCOL

SCIENTIFICALLY

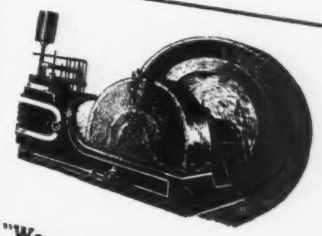
...Fingertips

TO EVERY LUBRICATION NEED

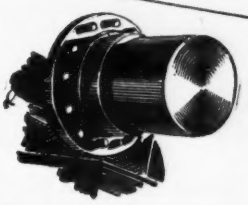


"70,000 Hours continuous operation . . . neutralization only .09." That's typical of the unusual performance achieved with Tycol Turbine Oil. Thanks to Tide Water's Edeleanu process, this oil has greater stability and resistance to emulsification . . . assuring more economy, steadier operation, smoother performance.

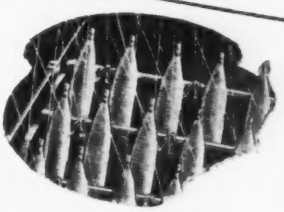
"No more trouble with sticking valves . . . costly delays and overhauls eliminated . . . engines giving better service . . ." — that's how one plant engineer describes the improved results gained with Tide Water Diesel Oil. It assures maximum economy — top performance — from every gallon of lubricant.



"We saved 33⅓% in oil costs when we changed to Tide Water E. A. Cylinder Oil." That report from a plant engineer typifies the kind of economical, trouble-free lubrication provided by Tide Water Steam Cylinder Oil in hundreds of plants. It gives better protection, promotes efficient operation and lowers lubrication costs.



"Never a single bearing overheated since we changed to Tide Water Green Cast Grease," says one chief engineer. No matter how severe the service, Tide Water Green Cast Greases assure better lubrication . . . less maintenance. The reason? They contain more high-grade cylinder oil — less soap — which means better performance in every application.



"300,000 Spindles operating for 13 years without a single lost tube" — that's a textile mill operator's way of pointing out the superior performance of Tycol Spindle Oils. For every textile application — from power plant to finishing — there's a Tycol Lubricant scientifically engineered for the job.

INDUSTRIAL TYCOL OILS-GREASES

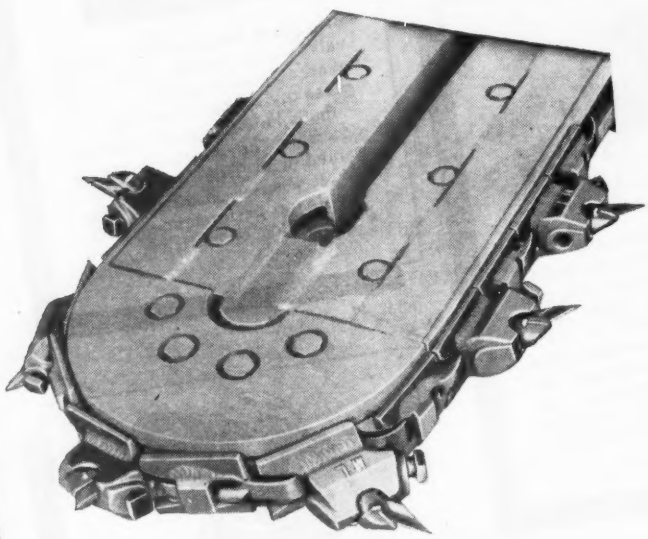
INDUSTRIAL LUBRICANTS

ENGINEERED FOR EVERY INDUSTRIAL USE

What makes BOWDIL the best Coal Cutting Equipment?

BOWDIL'S reputation as a manufacturer of the finest coal cutting equipment is built on:

1. Knowing the needs of our market . . . and designing equipment to meet those needs!
2. The maintenance of high quality standards, both in material used and in our methods of manufacture. Only specially selected scientifically heat-treated alloy steel is used.



Take special note of the BOWDIL Cutter Bar illustrated above. It's designed to reduce power requirements, to cut a thinner kerf and to produce salable coal, not "bug-dust"! The Z-bar construction is thin, compact and affords greater strength and rigidity than ever before obtainable. Body sections are drop-forged steel, built to distribute, rather than concentrate stresses. Chain connections are large, positive and kinking tendencies don't exist.

Write for complete construction and operation data on the BOWDIL Combination—Bar, Chain and Bits. Your letter today will bring details. Address the Bowdil Company, Canton, Ohio.

bowdil "Headquarters for Coal Cutting Equipment"

Canton Ohio

1 oil does these 3 jobs better

than many special oils

THREE most frequent uses of oil in your plant—outside of power generating equipment—are probably in gear cases, air compressors, and hydraulic systems. As widely different as these three jobs may appear to be, one oil—Stanoil—has qualities that fit each use better than many special purpose oils. It offers these advantages:

1. It means one brand of oil to handle and keep in stock in place of three.

2. There is less chance for misapplication of lubricants with fewer oils from which the oiler must choose.

3. It simplifies procedure when oil is reclaimed or reused for other services.

4. There is one convenient source of supply to contact.

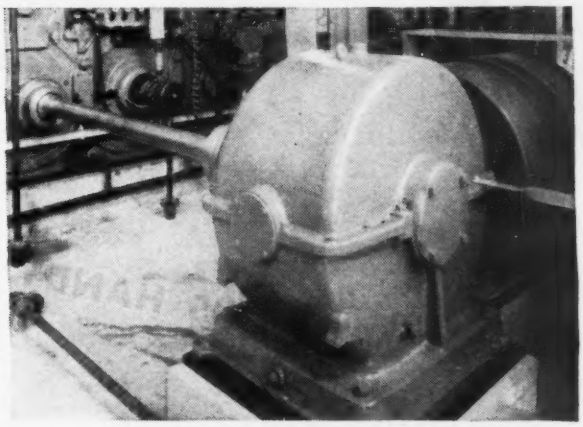
These are *plus* advantages. In addition, Stanoil does an outstanding lubricating job wherever it applies. Let a Standard Oil Lubrication Engineer help you standardize your lubrication requirements by applying Stanoil wherever it can be used throughout your plant. Call your local Standard Oil Company (Indiana) office, or write 910 S. Michigan Avenue, Chicago 80, Illinois, for the Engineer nearest you.

★ STANOIL ★

★ ★

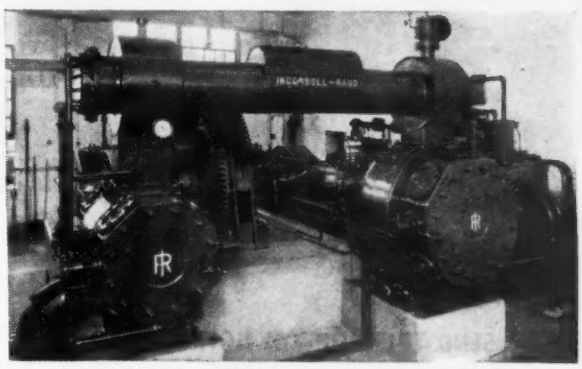
Stanoil as a HYDRAULIC OIL

High viscosity index—an oil's ability to resist changes in viscosity with changes in temperature—is one of the qualities that recommend Stanoil for hydraulic systems. It flows readily at starting temperatures, yet it does not thin out excessively at high operating temperatures, thus providing more uniform operation. High stability against oxidation is another quality of Stanoil that adds to oil life. It prevents the formation of deposits that are so objectionable in hydraulic systems.



Stanoil as a GEAR CASE OIL

High stability of Stanoil is also an advantage in gear cases of speed reducers. Stanoil resists oxidation caused by agitation in the presence of air—a condition natural to speed reducer operation—and prevents the formation of deposits caused by oxidation. Low pour test is a quality of Stanoil which eliminates starting trouble where gear cases are exposed to low temperatures.



Stanoil as a COMPRESSOR OIL

The low carbon-forming tendencies of Stanoil are a great advantage in compressor lubrication. Oxygen in the air and heat generated by compression tend to oxidize oils in compressor service. Again Stanoil's high stability resists oxidation and reduces troublesome valve deposits.

Buy more War Bonds

STANDARD OIL COMPANY (INDIANA) STANDARD SERVICE

★ LUBRICATION ENGINEERING

NOW Get the Right Varnish for that Insulating Job

Quickly-Easily-Accurately...

WITH THIS HANDY VARNISH SELECTOR
GENERAL ELECTRIC
INSULATING VARNISH SELECTOR
How To Use Selector
1 Under RECOMMENDED APPLICATIONS find the one you are interested in.
2 Move slide until red triangle points at selected number of the G-E varnish particularly adapted for the application you have in mind. The varnish on top opposite the triangle indicates additional varnishes for which the same varnish can be used.
3 See other side for Type of Base, Temperature, Viscosity and Recommended Thinner.
1696
G-E VARNISH NUMBER
CHARACTERISTICS
Quick Drying
Flexibility
Toughness
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Dielectric Strength
Heat Endurance
Resistance to: Mineral Oil, Acid, Alkali, Moisture
Baking Time in Hours: 110°C, 125°C, 135°C, 150°C
Air Drying Time in Hours
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- Random-Wound Stators and Low-Speed Rotors
- Random-Wound High-Speed Rotors
- Form-Wound, High-Voltage Stators and Rotors
- Treating Complete Stators and Rotors
- Transformer Windings, Control Coils, Magnet Coils
- Large Field Coils, Brake Coils
2 INSULATING AND FINISHING COILS AND WINDINGS
- Quick Dry, Oil-Proof, Formex Windings
- Resistance to Oil, Weather, Moisture
- For Finishing Coils, Motors, and Compensators where baking is not practical
3 GENERAL REPAIR WORK
- Air Dry; Resistance to Acid, Moisture and Weather
- Air Dry and Quick Baking; Resistance to Acid, Moisture, Oil and Weather
Excellent
Good
RESIN AND INSULATION MATERIALS DIVISION - GENERAL ELECTRIC CO., SCHENECTADY 5, NEW YORK

IT'S FREE!

Ask your G-E Distributor for it

A quick glance at this handy, easy-to-use Varnish Selector gives you all the facts on 7 outstanding insulating varnishes — characteristics, applications, baking and drying time, base, thinner, viscosity—everything you want to know. Ask your local G-E Merchandise Distributor for one and you'll always have this essential information at your finger tips, ready to use. A list of G-E Distributors is available on request from Section RIM352-18, Resin and Insulation Materials Division, General Electric Company, Schenectady 5, New York.

SEND THIS COUPON NOW TO YOUR LOCAL G-E MERCHANDISE DISTRIBUTOR

Gentlemen:

Please send me a G-E Insulating Varnish Selector as offered in Coal Age.

Name .....

Title .....

Company .....

Address .....

GENERAL ELECTRIC

TAKES TOUGHEST POUNDING

on hard rock jobs

HEAVY-DUTY FEATURES of the Goodyear HARD ROCK LUG TIRE

1. Massive lug-bar tread
2. Extra-thick undertread
3. Tread-armored sidewalls
4. Superstrong Rayotwist cord carcass

TOUGHEST of all rock-work tires is Goodyear's Hard Rock Lug – performance-proved by years of standout service on every type of tire-killing ground.

That's because this great bruise resister – specially designed for rough, hard work – is super-armored with extra-heavy undertread and with massive, wide-base lugs that grip and guard, extending well over the shoulders to *tread-armor* the sidewalls against cuts and bruises.

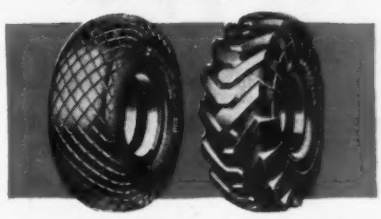
Built from today's available materials – including the mandatory amount of synthetic rubber – this rugged giant is tougher than ever, thanks to its Rayotwist body – made from Goodyear's patented rayon cord. *It's the strongest body we've ever used in a work tire!*

And that tough tread is Goodyear's famous universal two-way tread. No rights, no lefts – same grip reverse or forward. What's more, it's a self-cleaning tread, with straight, wide, V-shaped grooves open at both ends and so pitched that dirt and stones slide out as the tire turns!

Add up all these features and you see why job-wise contractors rate Goodyear Hard Rock Lug tires first choice for the really rough hauls.

BUY WAR BONDS—BUY FOR KEEPS

THERE'S A GOODYEAR FOR EVERY JOB



For drawn vehicles specify Goodyear All-Weather Earth-Mover

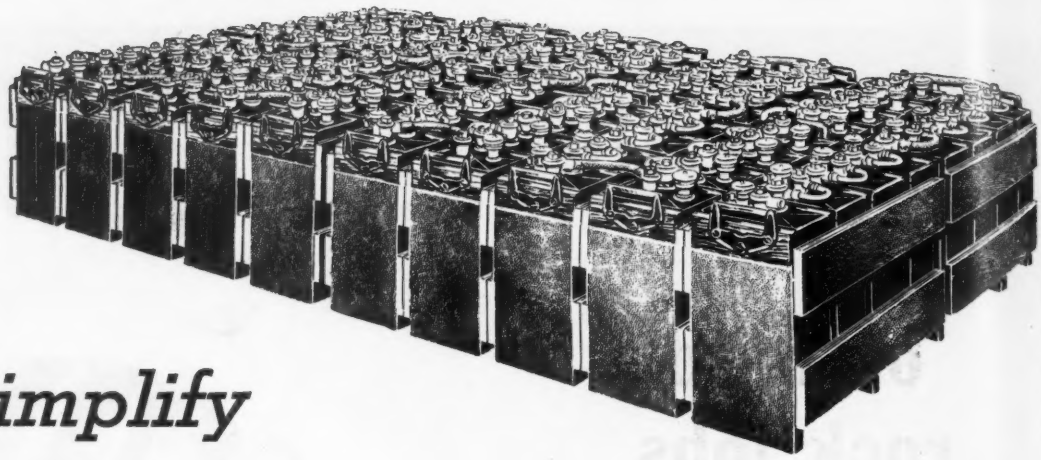
For traction in soft going specify Goodyear Sure-Grip

Rayotwist, All-Weather, Sure-Grip—T. M.'s The Goodyear Tire & Rubber Company

GOODYEAR

THE GREATEST NAME IN RUBBER

MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND



They *Simplify* Battery Charging

AMONG the time- and cost-saving advantages of powering locomotives and shuttle cars with Edison Alkaline Batteries is the relative ease and speed with which they can be recharged. No critical adjustment of charging rates is necessary. Hence they can be charged direct from the d-c power supply through relatively inexpensive resistors and without the need of motor-generators. They can be fully charged in as little as 6 to 7 hours, thus making it relatively easy to do all charging during off-peak periods, and correspondingly reducing maximum demand.

Alkaline batteries also give you the additional operating advantages listed at the bottom of the page. These advantages explain why alkaline batteries are so dependable, give longer service life than other types of batteries, and are so economical. *Edison Storage Battery Division of Thomas A. Edison, Incorporated, West Orange, New Jersey.*

Edison

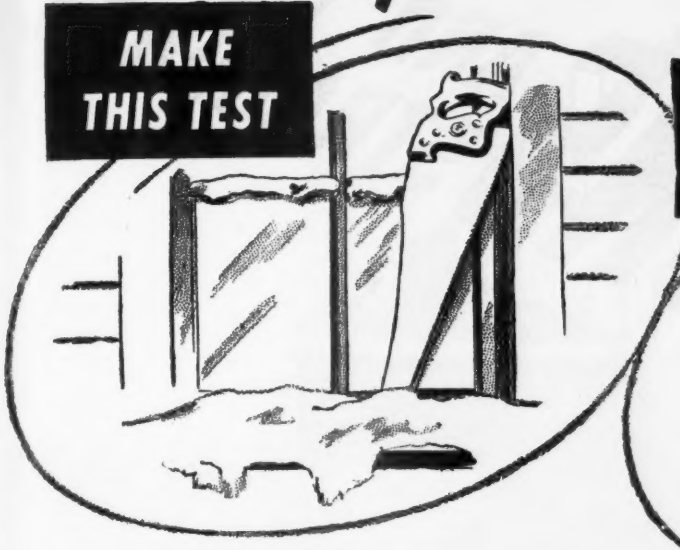
ALKALINE BATTERIES

In Mine Locomotives and Shuttle Cars Alkaline Batteries Give You These Important Advantages

- They are **durable mechanically;** grids, containers and other structural parts of the cells are of steel; the alkaline electrolyte is a preservative of steel.
- They are **foolproof electrically;** are not injured by short circuiting, reverse charging or similar accidents; are free from self-deteriorating reactions.
- They are **simple and easy to maintain.**
- They can be **charged rapidly;** do not require critical adjustment of charge rates; can be charged directly from mine d-c supply.
- They **withstand temperature extremes;** are free from freezing hazard; are easily ventilated for rapid cooling.
- They can **stand idle indefinitely** without injury, without attention, and without expense.

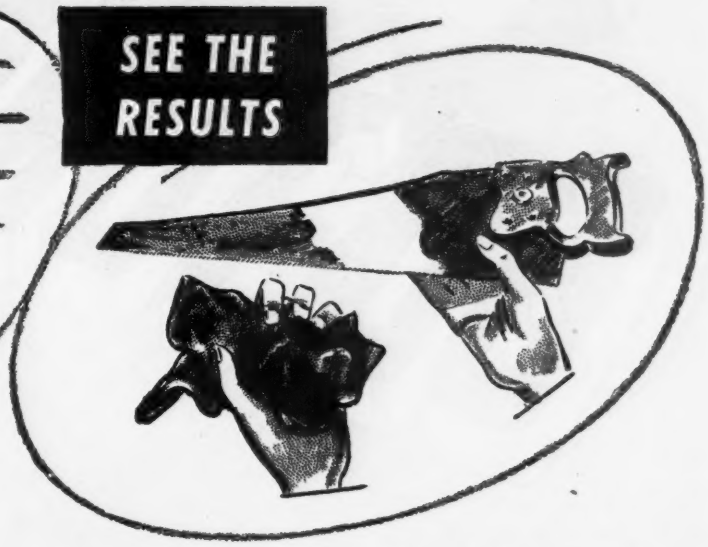
How to *prevent* Corrosion

MAKE THIS TEST



Coat a section of any piece of raw metal with a protective film of Anti-Corrode. Place it out-of-doors, and leave exposed to the elements.

SEE THE RESULTS



Rain, snow, changing temperature, dust and grime have eaten into and oxidized the unprotected metal. But note surface under Anti-Corrode film—bright and unharmed, in its original state.

CITIES SERVICE ANTI-CORRODE is a safe rust and corrosion preventive that brings amazing results. It is a reliable safeguard against corrosion of metals in any form or state of finish—whether in storage or in transit. Anti-Corrode forms a tenacious, durable film that is impervious to moisture and the more common gases prevalent in the atmosphere. And, since it contains lubricating material, it need not be removed in drawing operations. Anti-Corrode is made in several grades to meet specific requirements and severest tests. It is economical, easy to apply and can be removed with kerosene or any petroleum solvent.

This TEAM Will Save You Money and Materials

Recently, we announced the development of Cities Service Rust Remover, and responses to the demonstration offer far exceeded our expectations. Rust Remover, of course, *removes* rust. Anti-Corrode is designed to *prevent* rust and corrosion. Together, they will safeguard your equipment and war production—for the duration!

Take advantage of this FREE ANTI-CORRODE demonstration offer
Mail this coupon today!

(Available only in Cities Service marketing territory EAST of the Rockies.)

CITIES SERVICE OIL COMPANY
Room 233, Sixty Wall Tower, New York 5, New York

Gentlemen: I would like to test Anti-Corrode on my own equipment FREE OF CHARGE. Please send me the details.

Name_____

Company_____

Address_____

City_____ State_____

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CITIES SERVICE OIL COMPANY
NEW YORK · CHICAGO

IN THE SOUTH
ARKANSAS FUEL OIL COMPANY
SHREVEPORT, LA.

Working easily, Walter Tractor Trucks are well within their capacity when hauling 60 ton payloads. They are especially designed and constructed to pull such enormous loads under the most difficult running conditions—without undue strain on running parts. In spite of the huge loads, they maneuver readily in confined spaces and match the speeds of smaller trucks. Their smooth traction reduces wear and tear on roads and tires.

Great haulpower is provided by the carefully engineered combination of 300 H.P. Butane engine and Walter Four Point Positive Drive. Three automatic locking differentials prevent wheel slipping on steep grades, slippery surfaces, in deep mud or soft dirt. Walter Tractor Trucks impose no strain on drivers because cab forward design, scientifically distributed weight, short wheelbase and hydraulic steering provide rapid, easy maneuvering in confined spaces. Among the other outstanding features are the tractor type transmission and suspended double reduction drive.

Gain the full tonnage enormous payload capacity should deliver.

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how much will it cost you NOT to wash your coal

It might cost you your mine. If you cannot hold your markets with unwashed coal, your mine can't last too long.

You can't judge future markets by the present or the past. It is becoming increasingly evident that the coal buyer will be buying on a basis of *net cost per 1000 pounds of steam,* not cost per ton or per B. T. U. It will be the performance of your coal in his plant that will guide his purchasing.

That's why — it's not what it costs to wash your coal. It's what it costs NOT to wash it that really counts.

Let's talk it over.

A Σ G CD

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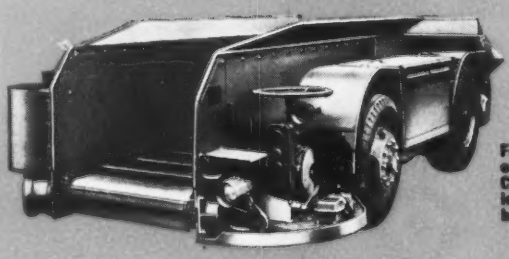
Joy Shuttle Cars in use hauling potash.

MENTIONED MORE AND MORE IN MINING NEWS

MECHANIZED MINING

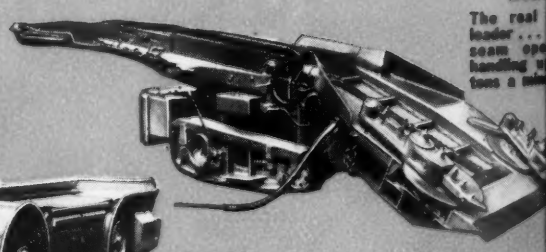
WITH JOY LOADERS AND SHUTTLE CARS

for Profitable Movement of Large Tonnage



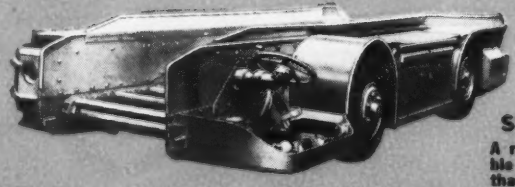
Joy 42" Shuttle Car

For use where height of seams permits. Capacity 5 tons per load . . . conveyor bottom equipped.



Joy 11 Load

The real loader . . . seam ope handling tons a



Joy 32" Shuttle Car

A rugged, dependable hauling vehicle that is built especially for low seams.

Joy Loader filling a mine car directly from floor.

s you read the prominent mining trade journals month after month, otice the frequency of articles about shuttle car mining operations. That's dication that the thinking in the industry tends toward these methods of ining for most efficient, economical, volume tonnage movement.

Then, when the same article, or a separate one in these same publica- ons reviews modern mines, notice how many are using Joy Loaders . . . e perfect team-mate for Joy Shuttle Car operations.

These mentions add up to only one thing. . . Joy Equipment is proving s superiority . . . doing the job well, wherever it is being used.

"WHEREVER THE JOB IS TOUGH—WORK WITH JOY"

There's no obligation for consulting a Joy Engineer

Joy 14 Bu. Loader

A high capacity machine that loads up to five tons per minute. Suitable for use in low seam work.

JOY MANUFACTURING CO.

FRANKLIN, PA.

"Safer safety" is an ultimate goal, to be achieved only by combining the right material, the right man, and the right method. Here is the Primacord deal:

Primacord offers *safer storage*, because sparks, friction or ordinary shock do not affect it.

Primacord offers *safer distribution*, because Primacord must be detonated. Common laborers can carry it without danger to the point of use.

Primacord offers *safer loading*, because no cap goes into the hole. Simply lace and lower the bottom cartridge, complete the load, stem and tamp.

Primacord offers *safer firing*, because you attach the detonating cap or caps to the main trunk line when all is in readiness to fire the blast.

Primacord offers *safer digging*, because every cartridge when properly placed is detonated by Primacord. No unexploded powder is left in the rock pile.

THE ENSIGN-BICKFORD COMPANY · Simsbury, Connecticut

P-3

Four aces that win the hand for Primacord Detonating Fuse with a high card to spare.

Also
ENSIGN-BICKFORD SAFETY FUSE
Since 1836

PRIMACORD-BICKFORD

Coal Age

DEVOTED TO THE OPERATING, TECHNICAL AND BUSINESS PROBLEMS OF THE COAL-MINING INDUSTRY

Ivan A. Given, *Editor*

MARCH, 1945

Not As It Seems

JOHN L. LEWIS, in his demands on the operators at the opening of the 1945 bituminous wage conference, again served notice that the coal industry and the coal miners are not to be his primary concern but simply a means to an end. That end is organization of any other industries Lewis fancies. When his announced intentions in the chemical industry, for example, are matched against the demands for a royalty of 10c. per ton and the right to halt production at will, even the resounding words in which they are cloaked fail to conceal the real purposes of these demands—a war chest for organizing backed up by ability to shut off fuel and raw material at any time.

When James Caesar Petrillo succeeded in taxing record makers for the benefit of the Musicians' Union treasury, it was expected that it would serve—as it has—as a cue for Lewis. These prognosticators were only too right, not only in that but in forecasts that demands for direct and "fringe" wage increases would be heavy and that attempts to invade the proper field of management would be carried even farther. In effect, Lewis declared war not only on the operators but on the miners and the public as well, not to mention the armed forces, as they also stand to suffer through strikes, loss of wages, loss of business to competition and higher prices if Lewis succeeds in his campaign to use them as vaulting stones. He also declared war on government stabilization policies, but it would be an optimist indeed who would say that any help in arriving at an equitable settlement was to be expected from the New deal in view of its established record of industry baiting and favors to union leaders.

Coal's role in the 1945 negotiations began to shape up as difficult long before their opening, with everything pointing to no more than a rather slim chance of the operators escaping being ground between the upper and nether millstones—Lewis and the New Deal. As in 1943, the industry's prospects lay in the hands of the War Labor Board, whose actions since its formation lend color to the charge that its labor members, in combination with a majority, if not all, of the public members, have been availing themselves of its wartime powers to remake industry to their own liking. Nothing in the board's history gives any assurance that if it cannot grant straight wage increases and is stopped from "fringe" concessions it will not turn in still another direction, either on its own initiative or at the behest of some other government official or agency, and transfer management rights to the union in line with the New Deal philosophy of "Give 'em something." Contract by fiat is already an accomplished fact in coal mining and has given the industry no reason to anticipate that government officials making such contracts know or care what happens to the industry as a result.

While, as already stated, their position is difficult, the operators have gone into the 1945 negotiations determined to do everything possible to arrive at agreements that will prevent stoppages, promote production, protect the industry's future and conform to government regulations. It is sincerely to be hoped that they succeed. But if they fail in the face of extreme difficulties the fault will not be theirs but rather that of an administration that prefers to play class politics and bait industry even at the expense of the war effort.

The Right Road

COAL'S NO. 1 JOB still is winning the war. Afterward, however, No. 1 again will be maximum quality at lowest cost with good wages and working conditions for miners and reasonable returns for stockholders. The keys to cost, quality and safety, as well as tonnage, are well known and need only be employed. That they yield results is evidenced once more by the experience of the 116 mines and collieries qualifying for "Coal-for-Victory" awards, as well as that of the many others who did not quite reach specifications but nevertheless made vital contributions in the form of higher tonnages, increased efficiency and greater safety in 1944.

Coal for victory still is the watchword in 1945 but the job is much tougher. Manpower is the major consideration. Nevertheless, it is not the only one. If, by better use of machinery and men, output per employee could be raised only half a ton a shift, or 1,000 lb., the industry would be well on its way to reaching its goal despite manpower shortages. Better management, mechanization, improved supervision, better cooperation of employees and related improvements did the job for the award winners and their compatriots in 1944. Their experience proves the value of these well-tested principles not only in meeting war demands but in readying the industry for its position as the No. 1 source of energy in the peace to come also—provided John L. Lewis permits.

116 MINES

"Coal-for-Victory"

FOR OUTSTANDING service to the nation, the managements and men at 114 bituminous mines and two anthracite collieries have been voted "Coal-for-Victory" awards. Designed to stimulate war production, foster mining progress and honor outstanding accomplishment, these awards were offered by *Coal Age* with the support and cooperation of the Solid Fuels Administration for War to mark production increases of 6½ percent or more and efficiency increases of 10 percent or more in tonnage per man-shift in 1944 over 1943.

Five outstanding men concerned with coal mining formed the board of judges which met in Washington, D. C., Feb. 9 to review the data submitted by the entrants and vote the awards.

Fifty-five mines were double winners, receiving both the "War Production Efficiency" and "Victory Coal Production" awards. The efficiency award, honoring "outstanding contribution to the national war effort in the form of increased productive efficiency in 1944 above and beyond the average for the industry," went to 15 additional mines. Forty-six other mines and collieries applied for and received the production award honoring "outstanding contribution to the national war effort in the form of increased coal production in 1944 above and beyond the national goal."

No applications for awards were rejected because of technicalities, although one was returned because it was incomplete and later was approved upon such completion. Two other awards were held up pending submission of additional data. When these data confirmed the original conclusions, the judges subsequently approved these awards also. They were, however, compelled to deny awards in two instances where the data submitted showed that the properties clearly had failed to meet the specified percentage increases.

The bituminous properties receiving awards contributed 7,651,574 tons, or more than 25 percent, of the increase of 30,000,00 tons in national production in 1944. Increases at bituminous properties ranged from 6½ percent up, with the majority falling in the range of 10 to 20 percent.

The minimum figure for qualification for an efficiency award was set at 10 percent. Entries showed increases from that figure up, with more than two-thirds also falling in the range of 10 to 20 percent.

The 6½-percent minimum figure for tonnage increase was established in conformity with the national goal of 691,000,000 tons (bituminous and anthracite) set for 1944, an increase of 6½ percent over the output of 649,000,000 tons in 1943. In setting the figure of 10 percent as the minimum for increased output per man-shift, consideration was given, among other things, to the theoretical increase involved in lengthening the working shift under the present contract.

The board of judges comprised:

Dr. R. R. Sayers, director, U. S. Bureau of Mines, Washington, D. C.

Edward Steidle, dean, School of Mineral Industries, Pennsylvania State College, State College, Pa.

Carl Scholz, consulting engineer, Charleston, W. Va.

Prof. Harold L. Walker, head, Department of Mining and Metallurgical Engineering, University of Illinois, Urbana, Ill.

R. Y. Williams, consulting engineer and member of executive committee, Anthracite Production Control Plan.

In recognition of the importance of the operating management in efficient coal production, awards to mines and collieries carried with them the offer of individual awards to supervisors at these operations. Up to the time this report was prepared, requests for individual certificates for 1,229 members of the supervisory and managerial staffs at winning mines and collieries had been honored.

Significant and valuable as was the contribution to the nation's coal supply in time of war, this vital achievement was matched or bettered by the long-range implications of the means employed in boosting tonnage and increasing efficiency. In submitting ap-

WIN Awards

EFFECTIVE USE OF MODERN EQUIPMENT AND METHODS BY MANAGEMENT AND MEN BRINGS "COAL-FOR-VICTORY" AWARDS TO 114 BITUMINOUS AND TWO ANTHRACITE OPERATIONS. WITH NEARLY HALF WINNING BOTH TONNAGE AND EFFICIENCY AWARDS, THESE OPERATIONS CONTRIBUTED OVER 7,800,000 TONS TO COAL'S PRODUCTION INCREASE IN 1944.

Five outstanding authorities on coal mining constituted the board of judges for the "Coal-for-Victory" awards. Shown here going over the entries are (left to right): Carl Scholz, R. Y. Williams, Harold L. Walker, Edward Steidle and Dr. R. R. Sayers.

"COAL FOR VICTORY" AWARD WINNERS

WINNERS OF BOTH "WAR PRODUCTION EFFICIENCY" AND "VICTORY COAL PRODUCTION" AWARDS

ALABAMA

Alabama Power Co.:
Gorgas Mine, Gorgas, Ala.

Marigold Coal Mining Co.:
Marigold Mine, Jasper, Ala.

COLORADO

Bear Coal Co.:
Bear Mine, Somerset, Colo.

Minnequa Fuel Co.:
Morning Glory, Walsenburg, Colo.

ILLINOIS

Bunker Hill Coal & Mining Co.:
Bunker Hill, Collinsville, Ill.

Forsyth Carterville Coal Co.:
Forsyth Carterville, Carterville, Ill.

Freeman Coal Mining Corp.:
Freeman No. 1, Herrin, Ill.

KANSAS

The Pittsburg & Midway Coal Mining Co.:
Central Cleaning Plant, Mines Nos. 15 and 18, Scammon, Kan.

KENTUCKY

Dawson Collieries, Inc.:
Dawson Collieries, Dawson Springs, Ky.

The Elk Horn Coal Corp.:
Elk Horn No. 6, Jackhorn, Ky.

Fayette-Jellico Coal Co.:
Fayette-Jellico No. 2, Warren, Ky.

Harlan Central Coal Co., Inc.:
Totz Mine, Totz, Ky.

Louisville Gas & Electric Co.:
Cherry Hill, Central City, Ky.

Peerless Darby Coal Co.:
Darby Mine, Splint, Ky.

Republic Steel Corp.:
Republic Mine, Pikeville, Ky.

Sizemore Mining Co.:
Turner No. 3, Drift, Ky.

Smith & Stokes Mining Co.:
Blue Valley, Madisonville, Ky.

West Kentucky Coal Co.:
Hecla 1 and 2, Earlington, Ky.
North Diamond 2 and 3A, Earlington, Ky.
North Diamond No. 3, Earlington, Ky.
Poplar Ridge, Sturgis, Ky.

MISSOURI

Huntsville-Sinclair Coal Mining Co.:
Mark Twain, Huntsville, Mo.

OHIO

M. L. French Coal Co.:
Charter Oak, Pomeroy, Ohio

Hanna Coal Co.:
Dun Glen No. 11, Dun Glen, Ohio
Piney Fork No. 1, Piney Fork, Ohio

The David Z. Norton Co.:
Norton Mine, Adena, Ohio

Ura Swisher:
Swisher Mine, Cheshire, Ohio

PENNSYLVANIA BITUMINOUS

The Buckeye Coal Co.:
Nemacolin Mine, Nemacolin, Pa.

Castle Shannon Coal Corp.:
Coverdale No. 8, Coverdale, Pa.

Johnstown Coal & Coke Co.:
Portage No. 2, Portage, Pa.

Pittsburgh Coal Co.:
Banning No. 1, Van Meter, Pa.
Lindley Mine, Canonsburg, Pa.

Reitz Coal Co.:
Reitz No. 5, Scalp Level, Pa.

Republic Steel Corp.:
Crescent No. 2, Charleroi, Pa.

Rochester & Pittsburgh Coal Co.:
Lucerne Mine, Lucernemines, Pa.
Waterman No. 2, Homer City, Pa.

Victoria Coal Corp.:
Johnson Mine, Monessen, Pa.

Weirton Coal Co.:
Isabella Mine, Isabella, Pa.

Westmoreland Mining Co.:
Watson Mine, Moween, Pa.

Zeth Coal Co.:
Zeth Mine, Hopewell, Pa.

UTAH

Standard Coal, Inc.:
Standard Mine, Standardville, Utah

VIRGINIA

Stonega Coke & Coal Co.:
Imboden Mine, Imboden, Va.

WASHINGTON

Franklin Gem Coal Co.:
Black Diamond, Wash.

WEST VIRGINIA

Buffalo Eagle Mines, Inc.:
Riley 1 and 2, Braeholm, W. Va.

The Davis Coal & Coke Co.:
Mine No. 37, Coketon, W. Va.

Fairpoint Construction Co.:
Bridgeport Mine, Bridgeport, W. Va.

Marmet Coal Co.:
Cedar Grove No. 1, Hernshaw, W. Va.

Pardee & Curtin Lumber Co.:
Bolair Mine, Bolair, W. Va.

Pond Creek Pocahontas Co.:
Pond Creek Mine No. 1, Bartley, W. Va.

Red Parrott Coal Co.:
Red Cedar, Prenter, W. Va.

The Weyanoke Coal & Coke Co.:
Arista Mine, Arista, W. Va.

Wilcox Coal Co.:
Wilcox Truck Mine, Daniels, W. Va.

WINNERS OF "WAR PRODUCTION EFFICIENCY" AWARDS

COLORADO
Oliver Coal Co.:
Oliver Mine, Somerset, Colo.

KENTUCKY
Dawson Daylight Coal Co.:
Dawson Daylight 6 and 9, Dawson Springs, Ky.

OHIO
Moore Coal Co.:
Cadiz Mine, Cadiz, Ohio
Rail & River Coal Co.:
Mine No. 3, Aults, Ohio
Mine No. 6, McClainsville, Ohio

PENNSYLVANIA BITUMINOUS
Pittsburgh Coal Co.:
Banning No. 2, Whitsett, Pa.
Warden Mine, Sutersville, Pa.
Westmoreland Mining Co.:
Graff (1-2), Blairsville, Pa.
Roaring Run, Apollo, Pa.

VIRGINIA
Stonega Coke & Coal Co.:
Derby Colliery, Derby, Va.

WEST VIRGINIA
Ames Mining Co.:
Ames Mine, Fayette, W. Va.
The Lorado Coal Mining Co.:
Lorado Mine No. 2, Lorado, W. Va.
Pardee & Curtin Lumber Co.
Bergoo No. 3, Bergoo, W. Va.

WINNERS OF "VICTORY COAL PRODUCTION" AWARDS

ALABAMA
Republic Steel Corp.:
Sayre Coal Mine, Adamsville, Ala.
Stith Coal Co.:
Aldridge Shaft, America, Ala.
America No. 5, America, Ala.

COLORADO
Champion Coal Mining Co.:
Hawk's Nest, Somerset, Colo.

ILLINOIS
Chicago, Wilmington & Franklin Coal Co.
New Orient, West Frankfort, Ill.
Orient Mine No. 1, Orient, Ill.
Franklin County Coal Corp.:
Mine No. 5, Herrin, Ill.
Mine No. 7, Royalton, Ill.

INDIANA
Knox Consolidated Coal Corp.:
Knox 1, 2 and 5, Bicknell, Ind.

KENTUCKY
Consolidation Coal Co.:
Mine 155, Van Lear, Ky.
Mine 207-14, Jenkins, Ky.
Sentry Coal Mining Co.:
Sentry Mine, Madisonville, Ky.

OHIO
Hanna Coal Co.:
Crow Hollow No. 3, Bradley, Ohio
Georgetown No. 12, Adena, Ohio
Willow Grove No. 10, Neffs, Ohio
The Lorain Coal & Dock Co.:
Blaine Mine, Blaine, Ohio

PENNSYLVANIA ANTHRACITE
Pennsylvania Coal Co.:
Ewen Colliery, Pittston, Pa.
Underwood Colliery, Scranton, Pa.

PENNSYLVANIA BITUMINOUS
Iseman Bros.:
Iseman Bros. No. 2, New Bethlehem, Pa.
Johnstown Coal & Coke Co.:
Logan No. 4, Beaverdale, Pa.
Logan No. 6, Beaverdale, Pa.
L. C. S. Colliery, Inc.
Virginia No. 14, Heshbon, Pa.
Reitz Coal Co.:
Reitz 3B, Central City, Pa.
Republic Steel Corp.:
Brownsville Junction, Brownsville, Pa.
Rochester & Pittsburgh Coal Co.:
Sagamore Mine, Sagamore, Pa.

TENNESSEE
Fentress Coal & Coke Co.:
Wilder No. 5, Wilder, Tenn.
Pruden Coal & Coke Co.:
Back Creek No. 2, Pruden, Tenn.

UTAH
Carl Nyman:
National Mine, National, Utah

VIRGINIA
H. E. Harman Coal Corp.:
Harman Mine, Harman, Va.
Jewell Ridge Coal Corp.:
No. 1 Mine, Jewell Ridge, Va.

WASHINGTON
Monarch Coal Mining Co.:
Monarch Mine, Centralia, Wash.

WEST VIRGINIA
Ames Mining Co.:
Mingo Division, Thacker Mines, W. Va.
Amherst Coal Co.:
Amherst 3-B, Accoville, W. Va.
Buffalo Winifrede Coal Co.:
Buffalo Mine, Chattaroy, W. Va.
The Gauley Mountain Coal Co.:
Ansted No. 2, Ansted, W. Va.
Rich Creek 1-3, Jodie, W. Va.
Lando Coal Corp.:
Lando Mine, Lando Mines, W. Va.
Mountain Fuel Co.:
Glen Cambria, Flemington, W. Va.
Red Parrott Coal Co.:
Mine No. 2, Prenter, W. Va.
Ruthbell Coal Co.:
Deep Hollow, Kingwood, W. Va.
West Virginia Coal & Transportation Co.
Jeanne Anne, West Columbia, W. Va.
York No. 1 Mine, Clay, W. Va.

WYOMING
Sheridan-Wyoming Coal Co., Inc.:
Monarch Mine, Monarch, Wyo.

How Award Winners Did It

Winners of the Coal Age "Coal-for-Victory" awards, offered with the support and cooperation of the Solid Fuels Administration for War, assigned numerous reasons for their ability to increase tonnage and efficiency in 1944. Fully half, however, listed management and mechanization as major factors in their results, followed by employee cooperation and better supervision. In approximate order of number of times mentioned, these and other factors underlying the records of the award winners are:

- Better management.
- Complete or additional mechanization.
- Closer cooperation between men and management and better employee response to the need for maximum tonnage.
- Better supervision.
- Improvements in mining methods and operating practices, including betterments in haulage, face preparation, ventilation, concentration of workings, relocation of plants for more efficient operation, etc.
- More stripping at deep mines.
- Reduced absenteeism and fewer work stoppages.
- Longer working time.
- Better maintenance.
- Greater stress on safety.
- Better ventilation.
- Additional acreage or opening of new territory.
- More men.
- Better power or improved power facilities.

plications for efficiency awards, mines and collieries were required to outline how these increases were achieved. Their replies supplied additional proof of the validity of all the accepted methods of increasing efficiency, boosting tonnage, cutting cost and promoting safety.

The means employed were by no means related solely to the mechanics of coal mining. High in the estimation of a substantial majority of the winning mines was the attention paid to better management, more competent supervision and the achievement of closer cooperation between employer and employee. Such phrases as "better management," "improved supervision" and "more cooperation with workers" provided concrete evidence that at these properties at least as much of the effort and ability is being addressed to management and employee relations problems as to the effective use of machines.

The fact that mines showing the largest increases in both tonnage and efficiency listed one variety or another of better labor relations as a major factor takes on added significance when related to the results achieved. "Our increased tonnage per man-shift," one mine reported, "is due almost entirely to the attitude of the employees of this company. Our men fully realize the importance and necessity of increased coal production and really turned to with a will." Another mine which won both awards said that its record was achieved "by every employee contributing his utmost to the necessity of increased production."

"Close supervision and full cooperation of each employee," was the statement of another double winner. Commenting on a tonnage increase of nearly 40 percent at still another mine, an official of the company wrote: "Our increase in production and output per man was obtained by better management and better cooperation of all employees."

Further evidence of the fact that miner and management can work together to a common end was reflected in such comments as these: "the splendid cooperation of employees"; "cooperation from the local union was excellent"; "extra effort on the part of employees to increase production for the war effort"; "realization on the part of all concerned of the need for increased production"; "excellent cooperation from the officers and members of the local union."

Not all the credit, of course, went to better labor relations or greater effort on the part of workers. Mentioned almost as frequently as better management, better supervision and worker cooperation was the adoption or greater use of modern mining equipment and methods. Leading all others in this respect was the installation of new machinery. "Progression from part hand loading and part mechanical loading to complete mechanization underground" was cited by an official of an operation winning both awards as a major factor in its record. Another said: "We had more and better equipment," and such phrases as "complete mechanization," "installation of loading machines," "purchase of new units," and "installation of additional mechanical equipment" were frequent.

Evidence that management, under pressure for more tonnage, had reexamined methods for stimulating production in the face of declining manpower came from many of the winners. "Scheduled mine haulage and improved track," was listed by one mine which boosted its output per man-shift more than 17 percent. "Improved system of face operation" was the report of another operation where tons per man went up 85.9 percent in 1944. "Improvement in mine-car turnover as the result of greater efficiency on the part of our haulage crews, more available working places" was another report. "Concentration" said still another mine official.

Important as was the immediate result recognized by the "Coal-for-Vic-

tory" awards, the long-range implications are perhaps even more significant. Faced this year with a demand at least equal to last year's and with further declines in mining manpower, coal must strain every muscle and work every brain cell overtime to fulfill the nation's war requirements. Can it be done? It remains to be seen, but the experience of award winners makes this fact outstanding both for now and in the future.

Careful and persistent attention to the fundamentals of efficient production, all of them proved in actual operation, will put the industry well on the road to wartime tonnage and peacetime efficiency goals. Raising average output per man per shift only half a ton, or 1,000 pounds, would practically assure an output in 1945 equal to that of 1944, assuming no major stoppages or other interruptions to orderly production. In addition, it would provide coal with that much more of a future market advantage.

Among the fundamentals of efficient operation given new emphasis in the reports of award winners were:

Good management and adequate, competent supervision are the keystones of production and efficiency.

Real cooperation between miners and management can be effected and can yield benefits to all parties.

Installation of modern machinery and its efficient use pay off immediately in higher tonnage and greater efficiency.

Constant reexamination by alert management of all mining methods and practices is the best way to discover the shortcuts to greater tonnage and efficiency.

Improved safety is directly reflected in more coal and higher efficiency.

Proof of those fundamentals rests not on surmise or conjecture but in such reports of award winners as these:

From a mine which increased its tonnage 12.7 percent and its output per man-shift 11.7 percent:

"Greater efficiency was secured from the excavating shovels, which is the bottleneck of our productivity; (2) a lesser ratio of cubic yards of overburden per ton of coal recovered; (3) slightly greater tonnage recovered per acre; (4) improved mining methods; (5) better management; (6) better response from employees; (7) almost complete absence of absenteeism."

From a mine which increased its tonnage 19.7 percent and its output per man-shift 16.69 percent:

"Increased tonnage of 16.69 percent per man-shift in 1944 as compared to 1943 was chiefly obtained by increased supervision over all phases of the same mechanized mining methods and equipment used during both years."

From a mine which increased its tonnage 33.9 percent and its output per man-shift 27.4 percent:

"Our increased output per man-shift has been due chiefly to the fact that the mechanized method of mining is now 100 percent at our mine. There has been closer supervision of men and increased cooperation between labor and management."

From a mine which increased its tonnage 41 percent and its output per man-shift 20.8 percent:

"We did not lose one day on account of strikes or walkouts. . . . During the past year we have broken all production records in 27 years of operation and we attribute this to the fact that we have insisted on every man putting 10 percent of his wages in War Bonds when he applies for work and, in order for him to have the same take-home pay as he has been used to getting, he must load more coal. Our payroll deduction for bonds was over 13 percent of our payroll. Our average donation for the Red Cross was $5.05 per employee and for the U. S. O. was $7.07 for every employee on the payroll. . . .

"Every employee knows the owner by his first name and he in turn knows them and their families and, due to this fact, we are very much concerned about their safety, and during the past year we have not had a fatal or serious accident and had fewer accidents than any year since we have been in business."

Well Earned

At the conclusion of proceedings to determine the "Coal-for-Victory" award winners at Washington, D. C., Feb. 9, the following joint statement was authorized by the board of judges and representatives of Coal Age:

"On the basis of figures submitted to the board of judges, 116 mines and collieries throughout the United States have qualified for 'Coal-for-Victory' awards. To these winners we extend our sincere congratulations on a notable and substantial contribution to the cause of Allied victory.

"We are convinced, however, that we would be doing an injustice if we were to pass over without comment the excellent records compiled by the many other mines and collieries which, for one reason or another, failed to qualify for awards.

"We recognize that many mines and collieries fell short of the requirements set up for the awards by only the narrowest of margins—often because of circumstances well beyond their control. Yet their performance in the face of adverse conditions certainly has earned them the thanks of a grateful nation. Their determination to better their records was no less sincere than that of the actual winners. The additional tonnage produced in 1944 by these mines and collieries represented a large, vital and significant contribution to our national war effort.

"We wish, therefore, to take formal and public notice of the tireless and effective efforts of these mines and collieries and to commend their managements and employees to the utmost for a job well done."

BOX CUT

Yields 2,000 Tons Per Day at Pond River

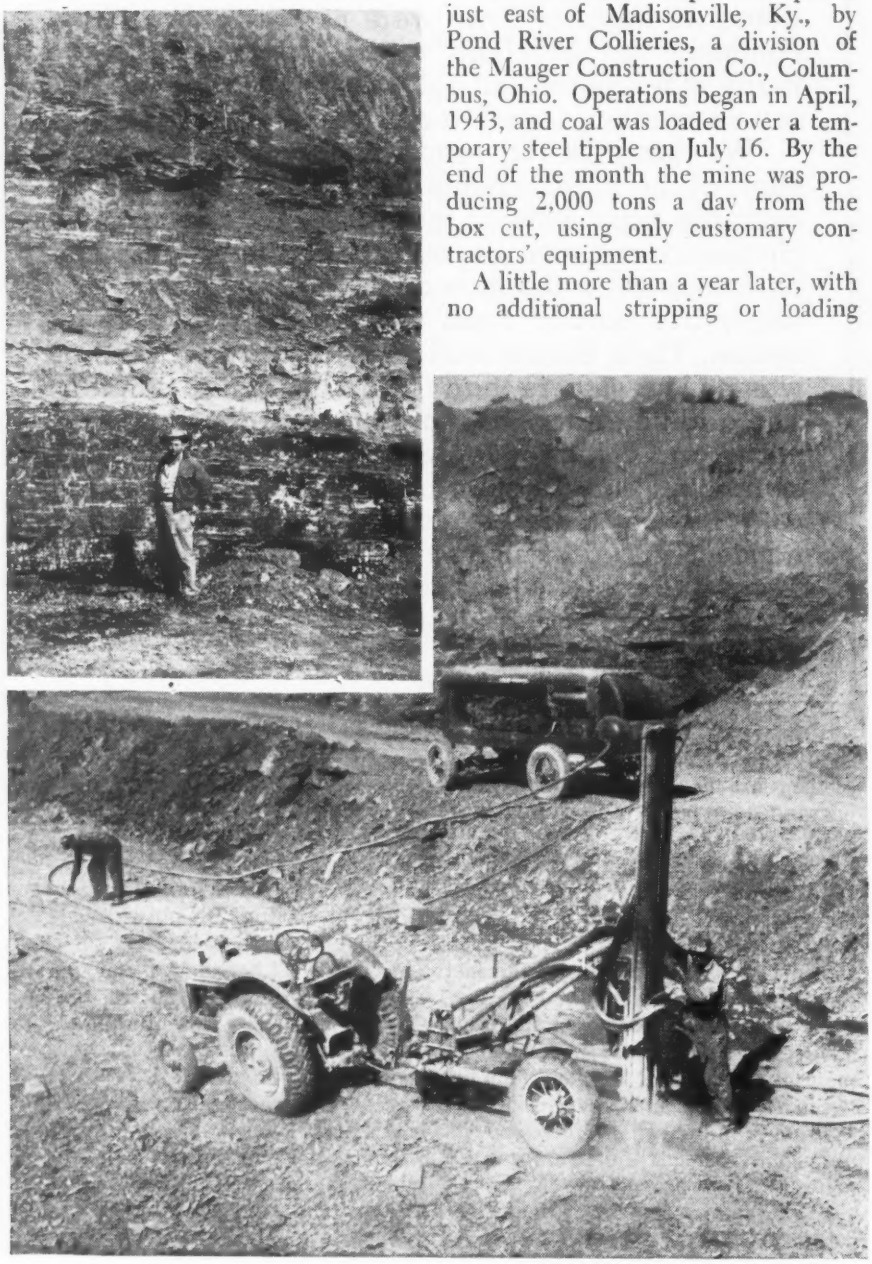
Employing Only the Customary Contractors' Equipment, Pond River Begins Production Three Months After Survey — Larger Trucks, New Shovel and 400-Ton Washery Will Increase Both Output and Quality

By **FRED W. RICHART**
Assistant Editor, Coal Age

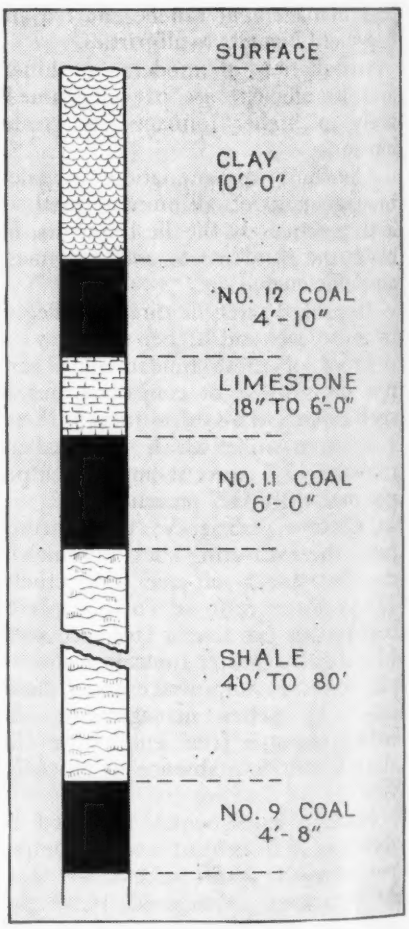
DAILY production of 2,000 tons of screened coal in three months from the time surveyors' stakes were driven is the record of a strip mine opened just east of Madisonville, Ky., by Pond River Collieries, a division of the Mauger Construction Co., Columbus, Ohio. Operations began in April, 1943, and coal was loaded over a temporary steel tipple on July 16. By the end of the month the mine was producing 2,000 tons a day from the box cut, using only customary contractors' equipment.

A little more than a year later, with no additional stripping or loading equipment but with new 22-ton trucks, the same tonage was being put through a new 400-tons-per-hour McNally-Pittsburg washery. Consistent production during this development period was reflected in shipment of 481,000 tons in the first twelve months of operation. With the washery in operation a daily production of 3,000 tons is expected from the present pit set-up.

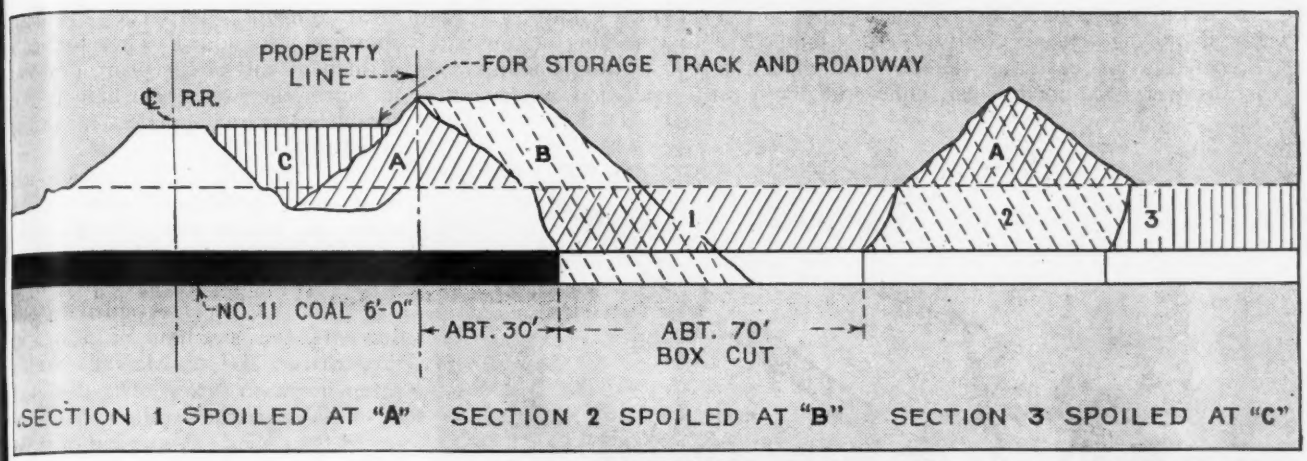
Unusual natural conditions favor high production with comparatively small equipment. Another help is the fact that the Illinois Central R.R. lies against the property, permitting a



Wagon-mounted air drill drilling limestone between Veins Nos. 12 and 11. Above left: Highwall, showing Nos. 11 and 12 veins.



Strip area showing approximate average thickness of coal veins and waste material.



Above: Method of making the box cut to salvage coal near railroad right-of-way. Numerals 1, 2 and 3 indicate areas from which material was removed; Letters A, B and C show where it was spoiled.

Right: This box cut, opened in clay overburden with 7-yd. dragline, produced 2,000 tons a day.

very short spur to serve the mine. Still other advantages were gained by adding a diesel-driven generator and swing motors to the dragline, and pressing the loader into rock-moving service during the second and third shifts.

The 1,200-acre body of coal being developed has three veins—Nos. 9, 11 and 12—a large portion of which may be stripped. The No. 9 vein, being the deepest, is not yet worked. No. 11 is mined alone in certain areas and in others, where it is overlapped by the No. 12 vein, they are worked together. However, because the burning characteristics of the two coals are different, they are processed, loaded and shipped separately. While there is some difference in vein thickness at various points, and variations in the separation of these veins, average conditions are approximated in an accompanying illustration.

The coal dips about 2 percent southwest and the surface slopes in the same direction, making it advantageous for drainage. Surface and pit water flows to the southwest limit where a single pumping plant will be installed to dewater the pit. A levee has been built around the low portion of the pit to exclude all flood water from the low ground. The gradual slope of the property permits low ground to be mined in dry weather and high ground in wet weather. Advantage already has been taken of that condition.

The original box cut was opened along the south side of the railroad track, uncovering the No. 11 vein. Total cover was only 12 to 14 ft. of pure clay, easy to dig. It was from this area that the original 2,000 tons per day were produced. To obtain all possible coal up to the right-of-way, some of the spoil had to be handled twice. Splitting the first spoil pile into two sections saved about 50 ft. of 6-ft. coal along the boundary.

The spoil next to the railroad fill, as it now stands, has been leveled and will serve both as a railroad storage track and a roadway into the office and washing plant.

One of the unusual tasks of the Northwest loading shovel is moving the rock between Veins 11 and 12 after the work shift is over. This means considerable moving of the shovel, which ordinarily results in extra expense and loss of working time. To reduce time loss and increase coal loading capacity of the mine, a Marion 492 5-yd. shovel has been ordered, and will be used only for coal loading. It will step up production at once and again when stripping capacity is increased.

Present workings are shallow. With but two veins being worked, coal recovery is large compared to the spoil that must be moved. When it comes to working the No. 9 vein, spoil will be more in line with what most strip mines must handle.

Pit equipment and trucks are all diesel-driven. The Page 620 6-yd. dragline, with 7-yd. bucket, was originally clutch-driven from a single diesel engine. This put so much work on the engine that stripping was slowed. However, speed and volume of stripping have been materially improved by adding an independent diesel-driven generator and motorizing the swing motion.

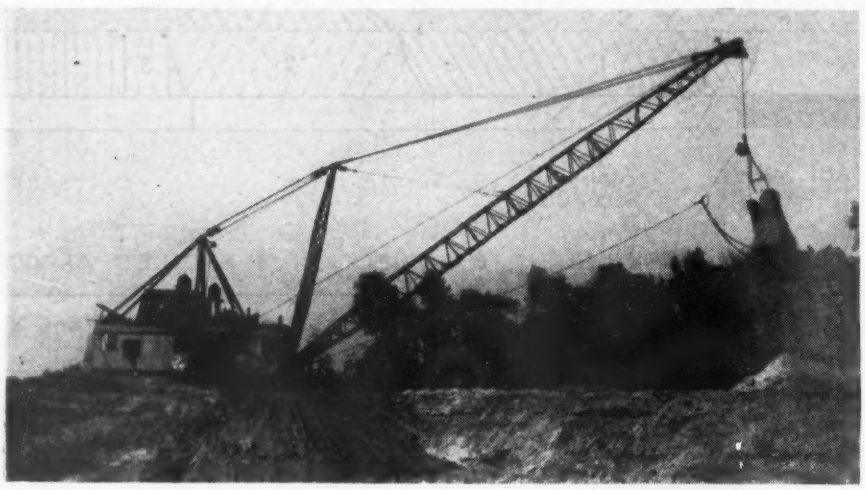
Wagon-mounted air drills powered by a portable diesel-driven air compressor drill the rock between the No. 12 and 11 coals. A small farm tractor to move the drills and air compressor completes the drilling equipment. The No. 12 coal and also the rock is broken by 1½x8-in. 60-percent dynamite. The No. 11 coal and such shales as have been encountered do not have to be shot.

In the early days of opperation, a contractor hauled coal from pit to screening plant. Five 10-ton rear-dump trucks were used until delivery of the mine's own 22-ton drop-bottom units. Roads have been graded and are being surfaced with gob. Grading, leveling and daily conditioning of all haulageways has been done with the usual type of road patrol. Waterproofing the road surface is scheduled to be completed soon.

The Page dragline graded the railroad connection and the mine yards. The empty track was spiraled around

a low hill, making a natural grade that required moving very little dirt.

Preparation of coal for the first year was over a temporary steel tipple from an abandoned mine. It was equipped with a shaking screen and three apron-type loading booms. To fit it to strip operation a concrete-lined dump pit with feeder and flight conveyor were added. They formed a permanent part of the plant, designed to serve the washery when it was completed. The hopper has a capacity of 80 tons.



Dragline at work at Pond River. The added diesel-electric swing set, not then inclosed, is shown on the top of the cab.

Stripping Equipment

1 Page 620 diesel-electric 6-yd. walking dragline with 110-ft. boom and 7-yd. bucket.

1 Northwest 80 diesel-driven crawler-mounted 2½-yd. loading shovel.

2 International TD-18 bulldozers, Bucyrus-Erie blades.

1 Chicago Pneumatic portable 315-c.f.m. air compressor driven by D-8800 Caterpillar diesel engine.

2 Cleveland pneumatic wagon drills.

1 Caterpillar No. 10 Auto Patrol.

5 Euclid 22-ton trailer trucks, 21.00x24-in. trailer and rear tractor times, 125-hp. Cummings diesel engines.

1 Commando car for pit travel.

1 Weapon carrier for pick-up service.

1 Marion 492 5-yd. loader on order.

Loading 22-ton trucks with 2½-yd. diesel shovel.

Since the raw coal conveyor was built as a permanent part of the plant, the washer was erected around and connected to it. This was done without stopping the production of coal. The washer is designed to produce 400 tons per hour of clean coal through two 200-ton McNally-Norton automatic wash boxes. The flowsheet is simple and the washery less congested than many. A number of items are worthy of detailed mention.

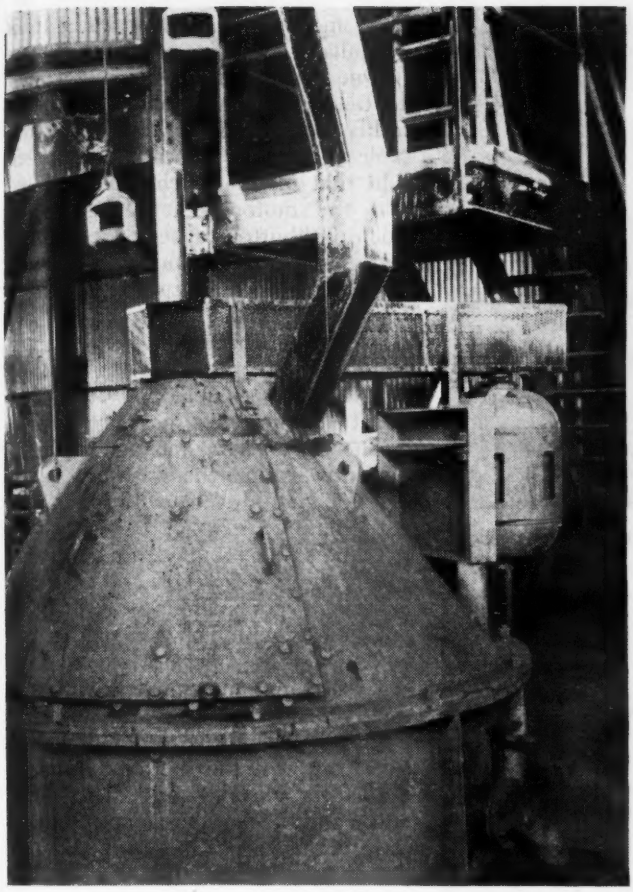
Use of a truck gearshift to provide nine speed adjustments of the feeder at the bottom of the raw-coal bin enables the hopper tender to gage the feed so that the wash boxes seldom run out of coal and do not lose their refuse beds, promoting uninterrupted operation and giving more uniform results. The pick breaker with its splitting action has an advantage over the rotary crusher since it produces a minimum of fines.

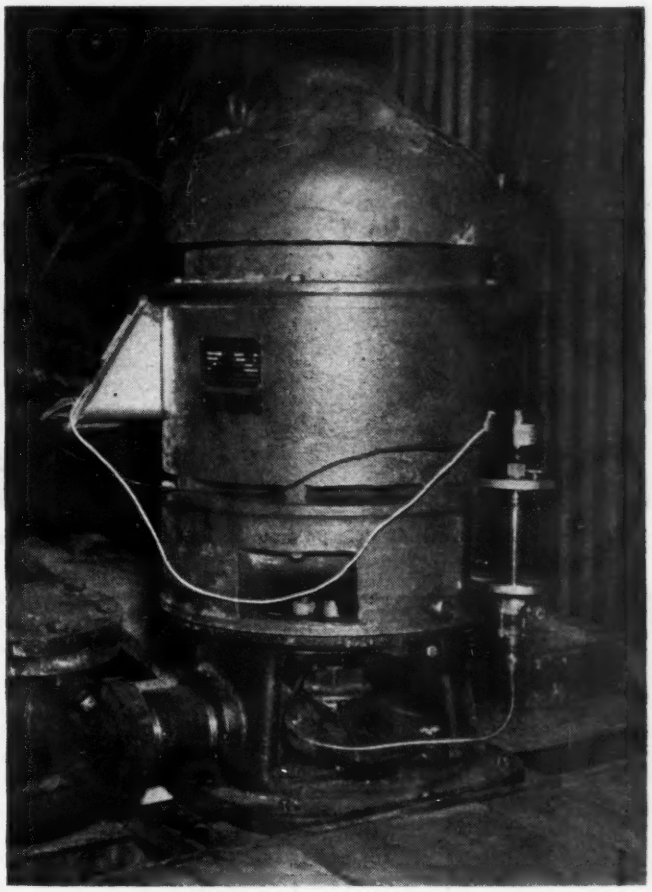
Two Wash Boxes Used

The raw-coal shaking screen delivers 6-in. lump to the lump loading boom, 6x2-in. raw coal to one wash box and 2x0-in. to the other wash box. If required, lump coal may be sent to a crusher and from there to the 6x2-in. box. A blank sheet in the shaking screen serves as a picking table from which pure refuse goes directly to the refuse bin and impure coal to a crusher and finally to the 6x2-in. washer. All refuse from the 2x0-in. unit and the heavy refuse from the 6x2-in. box go directly to the refuse bin to be disposed of by truck. Middlings from the 6x2-in. washer are dropped into a crusher and returned to the raw-coal conveyor to reenter the washing circuit.

The two wash boxes deliver clean coal to a common flume to the classifying screen, where it is separated into five sizes. the ⅜x0 coal is washed through a ⅜-in. perforated screen and sluiced to the concrete sludge tank. The other four sizes are delivered directly to loading booms. The customary vibrating dewatering screen is omitted from this plant.

The classifying screen has four sizes of round perforations: 3-, 2-, 1¼- and ⅜-in. The first three are carbon steel plates. The ⅜-in. perforated plate is made of 10-gage stainless steel. Being thin, it screens better; being made of stainless steel it does not rust and therefore does not blind.





Left: Centrifugal dryer with V-belt drive from vertical motor. Right: This deepwell pump supplying spray water to the classifying screens is driven by a 40-hp. vertical motor with electric control of lubrication.

Mixing baffles making 1¼-in. screenings from 1¼x⅜-in. and ⅜-in.x28-mesh coals.

The sludge tank extends from one corner of the plant for about 100 ft. parallel to the loaded tracks. The ¾x0 coal is sluiced into the near end of the tank where the large coal immediately settles. The extremely fine coal may not settle but may flow over a weir in the farther end of the tank where it is picked up by the suction of the circulating pumps. Thus the extreme fines may recirculate until density forces them out in the centrifugal dryer and an equilibrium is established in the wash water system in the plant.

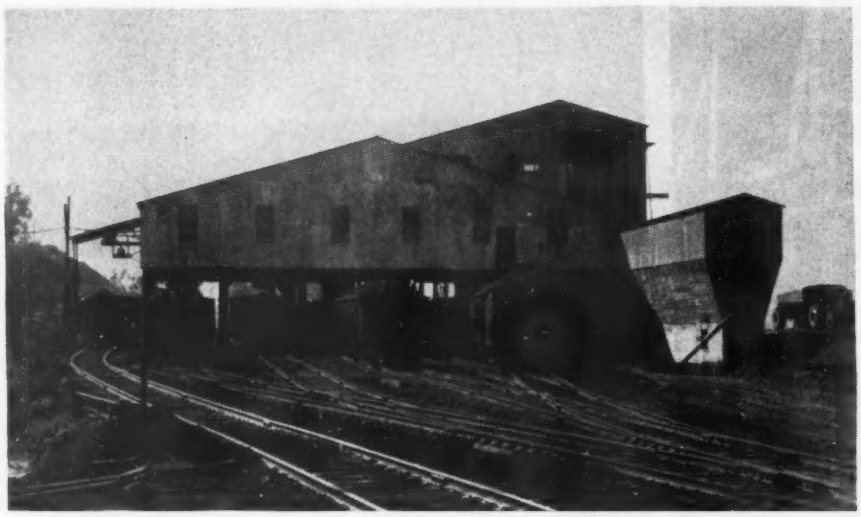
A long flight conveyor, reaching to the far end of the sludge tank, returns along the bottom, gathering the coal, which it delivers to an elevator in the end of the tank. Coal is dropped from the top of the elevator and divided into two streams, each of which is fed into a Norton-Carpenter centrifugal dryer. A bypass permits the coal to flow to the drain in event of failure of the dryers. The minus 28-mesh coal from the dryers is wasted to the drain, along with the effluent. The dried ¾-in.x28-mesh coal is fed to a conveyor from which it may be combined with other sizes or loaded out as carbon.

Aside from three apron-type loading booms, which are carried on roller chains, the conveyors in this washer are equipped with forged rivetless chains. The wash-box elevators use a rolled-steel flat-link chain. Lubrication facilities for all conveyor chains probably will be drippers. Walter G. Stowers, washery foreman, points out that there are conditions where no oil on a conveyor chain is best, particularly when fine coal can pack around it. He prefers to keep the chain out of the loose coal so lubrication will be effective.

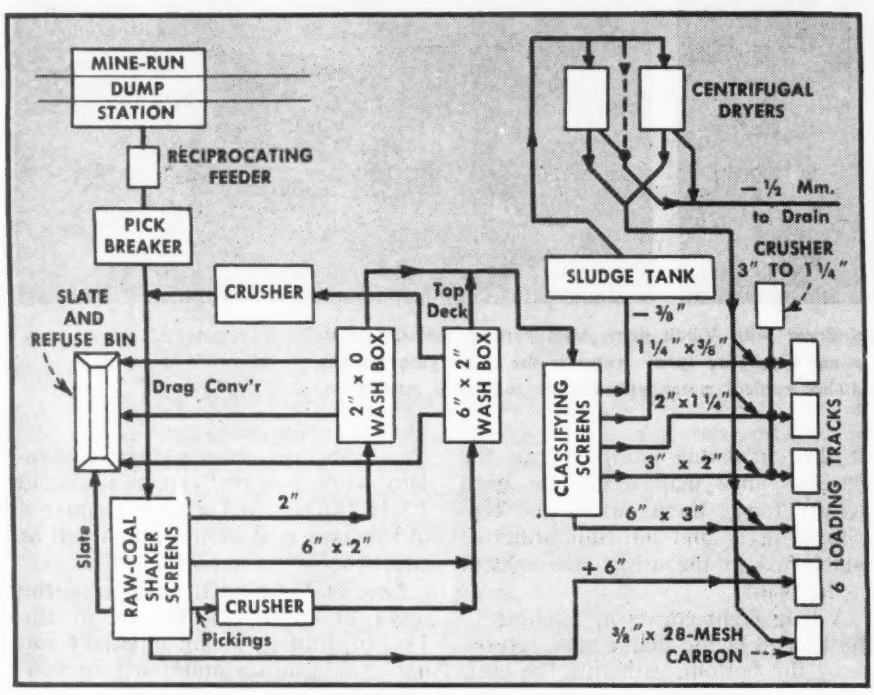
One of the modern features is the series of mixing baffles set in the 1½x⅜-in. loading boom, especially valuable in insuring uniformity in consist when the ⅜-in.x28-mesh coal is added.

A.c. power for the washing plant is brought in over a 33,000-volt transmission line. It is stepped down and delivered to the coal company at 4,000 volts and then is further reduced to 220 volts for driving the washer.

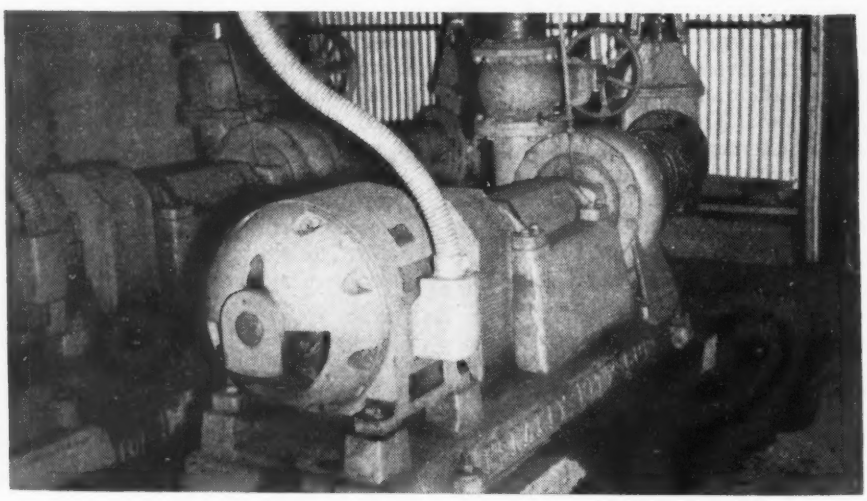
Two 220-volt circuits pass through two coil circuit breakers and feed two separate buses. The buses and wiring leading to the control switches are inclosed in a rectangular case having hinged doors on both sides for convenience in installation and maintenance. All motor and lighting circuits are tapped to the two buses, each motor and lighting circuit being protected by air circuit breakers tripped by overload relays. There are no fuses in the circuits. All circuits leading to motors, so far as possible, are over-



Loaded side of six-track 400-tons-per-hour coal washery; concrete settling tank at right.



Flowsheet of Pond River coal washer.



Duplicate 10x10 circulating pumps are driven by 75-hp. 1,175-r.p.m. motors.

head and out of reach of water leaks or spillage.

One man controls the plant from a central point with loading operations in his view and the pushbutton control table at his side. Indicating lamps tell him that motor switches have closed and the motor is receiving power. Each pushbutton carries a metal name plate indicating the motor it controls. The matching motor starter carries a similar plate.

Motors vary according to their applications, most of them being squirrel-cage, linestart. Circulating pumps are direct connected; shaking screens, crushers, conveyors and dryers are V-belt driven; and the wash-box refuse elevators are driven by gear motors with chain drive.

Outlets for portable lamp cords and small motor-driven tools are located at convenient points around the plant.

Other features of the washer include a crusher and mixing conveyor for coal 3-in. and smaller; wings in each side of the classifying screen to push coal attempting to ride down the sides out to the perforated plate; means for cleaning out the settling tank; and fresh-water sprays on the classifying screen. Spray water also is the make-up wash water.

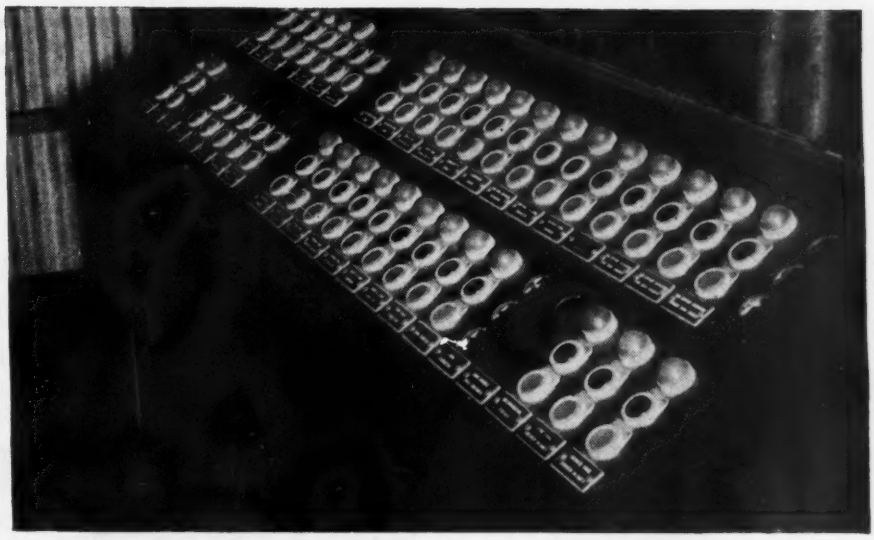
Fresh-water Supply

About a mile up the railroad track is Pond River and an abandoned railroad water station. Here, the motor-driven pumping plant is located, delivering spray water into a 5,200-ft. line of 6-in. Johns-Manville Transite pipe, which carries it to the storage reservoir near the plant. Pipe joints are made with a short coupling which slips loosely over the ends to be joined and is made watertight by rubber rings which close the space between pipe and coupling. The assembled pipeline is flexible and may be laid over uneven ground with the joints remaining watertight. It is not injured by acid water.

At the washery storage reservoir another pumping plant with a standby pump delivers water to the spray nozzles. The main pump is a Fairbanks-Morse vertical 9-stage deepwell-type unit driven by a 40-hp. 1,765-r.p.m. vertical 220-volt General Electric motor. It supplies 400 g.p.m. to the sprays over the classifying screen with 60-lb. pressure at the spray nozzles. The standby pump is a horizontal centrifugal unit driven by a 75-hp. motor.

Steps have been taken to supplement the present wash-water supply by settling out the slurry waste and storing the water. A series of earthen

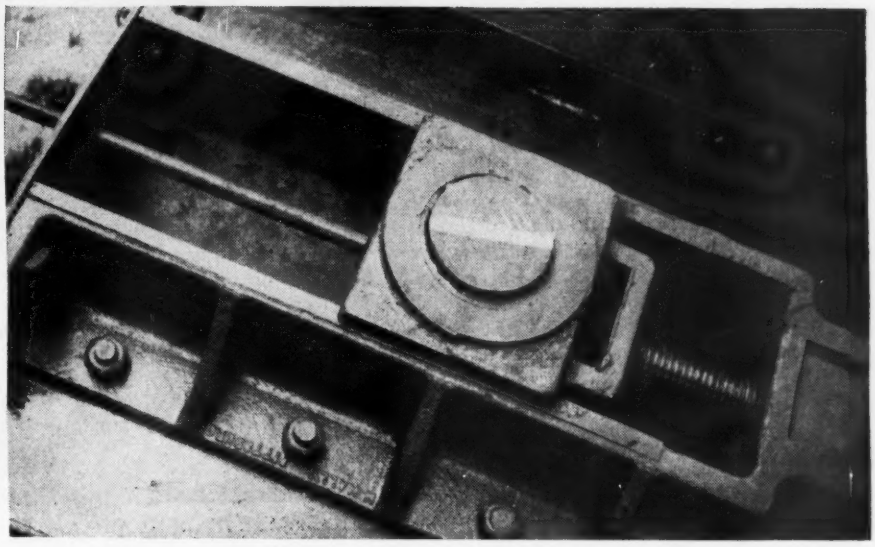
Washery boss—Walter G. Stowers, foreman.



Washery control center, with console-type pushbutton panel provided with indicating lamps and motor-circuit labels.

baffles, built like a sorghum evaporator, provide a long travel for the water, promoting settling of the solids and leaving the water clear for use when needed.

The seven-car truck garage and the repair shop were still under construction when this was written but repair facilities have not been neglected. Among the tools available are two portable and one truck-mounted arc welders, a portable air compressor and a high-pressure steam cleaning jenny. A temporary shop in one end of the supply house has the machine tools needed on a construction job.



Telltale tells all. The operator does not have to look twice to see if the shaft is turning and the machine is running.

Management

R. Paul Mauger . . . . . president

L. R. Chapman, general manager

Louis Chapman, superintendent

Walter G. Stowers . . . . . .

. . . . . washer foreman

J. T. Alexander . . . . . chief clerk

James Todd . . . . . billing clerk

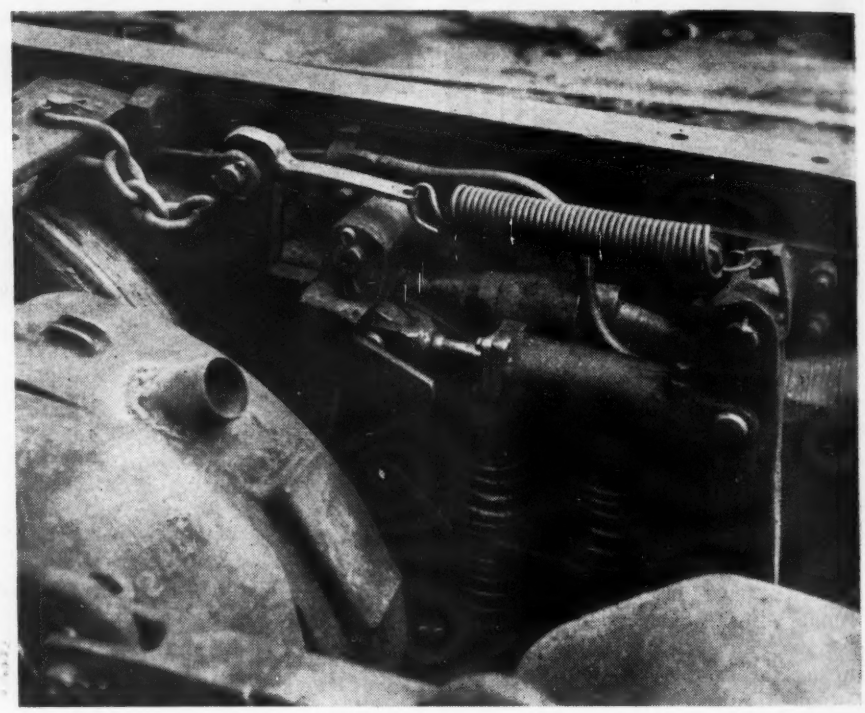
Coal Age meets Pond River—right to left, R. Paul Mauger, president, and Louis Chapman, superintendent, Pond River, and Fred W. Richart, assistant editor, Coal Age.

HYDRAULIC BRAKES
Improve Tandem Locomotives at Jenkins

Safety a Vital Consideration in Hydraulic Brake Installations—Stops Can Be Made Much Quicker—Locomotive Maintenance Is Reduced Materially—Space Required Is Less Than for Air Brakes

By R. L. BLAKE

Maintenance Foreman, No. 207 Plant
Consolidation Coal Co.
Jenkins, Ky.



Installation of hydraulic brake cylinder on 10-ton haulage locomotive—one of two making up a tandem unit. The chain (upper left), used when setting the brake by hand, replaced a solid link of the original hand-brake mechanism. The tension coil spring across the top to release the shoes was added by welding hooks to the brake arm and brake-hanger stud.

HYDRAULIC BRAKES added to a number of tandem haulage locomotives at the Jenkins (Ky.) operations of the Consolidation Coal Co. have shown many advantages in operation and maintenance. Among the foremost in value is greater safety in controlling trips. Compared to the hand brake in which turning the brake wheel took considerable time and delayed the stop, the hydraulic brake is applied by a small movement of the lever, thus achieving instant or gradual braking of both locomotives at the same time and utilizing their combined weights. With the original equipment the operator could apply the brake of but one locomotive at a time. Moreover, the operator can use both braking and sanding levers at the same time and thus bring the trip to a stop in the shortest possible distance. When emergencies arise, such as a roof fall, a broken rail or a wreck, this quicker stop is a very important safety factor.

The hydraulic equipment has eliminated the practice of using the controller and reverse to accomplish braking and thus has reduced maintenance of the motors and saved considerable electric power. That former bad practice by some of the motormen was due to the slowness of brake application when using the handwheel. High mechanical stresses growing out of that practice caused motor pinions to split and was a cause of broken axles and armature shafts and of axle cap bolts being stripped or broken.

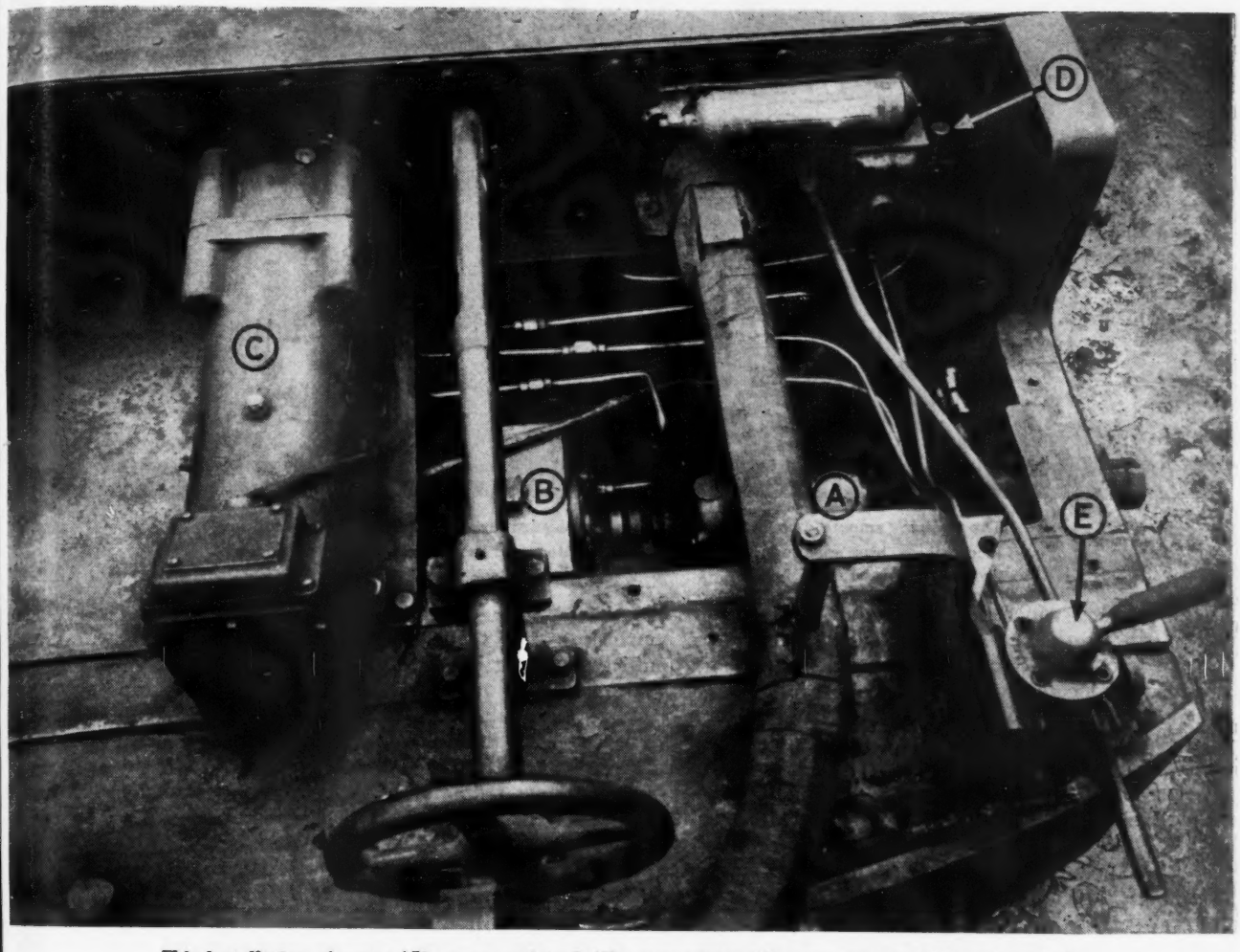
High magnetic stresses set up by high amperage during reversals caused field coil and armature failures. The stress caused the coils to press tighter against pole pieces and armature laminations, compressing the insulation and causing a looseness which resulted in wear and failure. The mechanical and magnetic stresses from reversing a locomotive while in motion are several times greater than those at rated full load.

Furthermore, use of the controller and reverse as a brake causes excess burning of fingers and contact tips. Likewise it results in rapid deterioration of contactors where such are used. Locomotives spending less time in the barn for repairs of controllers and armatures haul more coal and accumulate less maintenance cost.

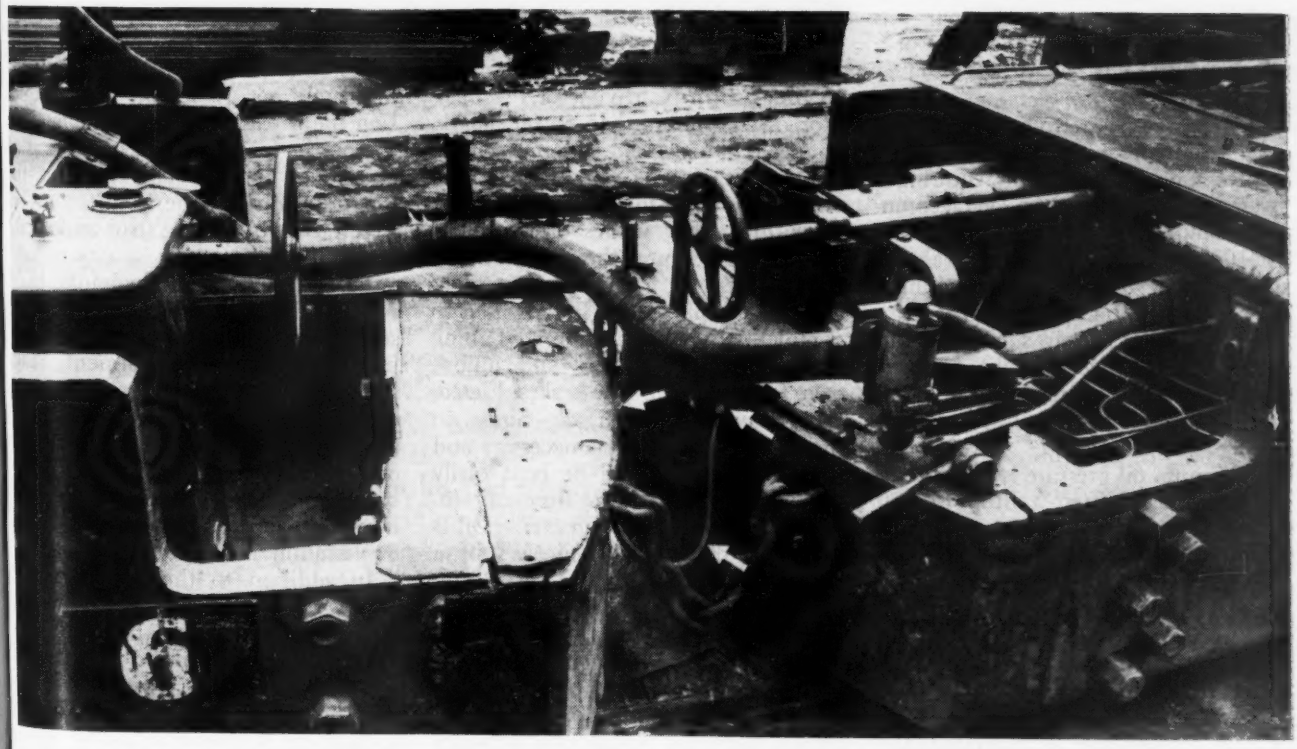
Another advantage realized from hydraulic brakes is the greater interest the operators show in the care of their locomotives. Men appreciate equipment which is easy to operate and is well suited to a job. Less space required for installation of the equipment is an advantage of the hydraulic brake as compared to an air brake. I refer to the Westinghouse A1-type hydraulic equipment for haulage locomotives.

Bringing coal to the new preparation plant at Mine No. 207 of the Consolidation Coal Co. at Jenkins (Coal Age, April, 1944, p. 65) involves long underground hauls. From the three sections of this mine the hauls are 3½ miles, 4 miles and 7 miles. Coal from Mine No. 214, to be prepared at the 207 plant, must be hauled approximately 10 miles. Moving about 8,000 tons to the plant in two shifts and mostly over single-track haulways requires high-speed operation.

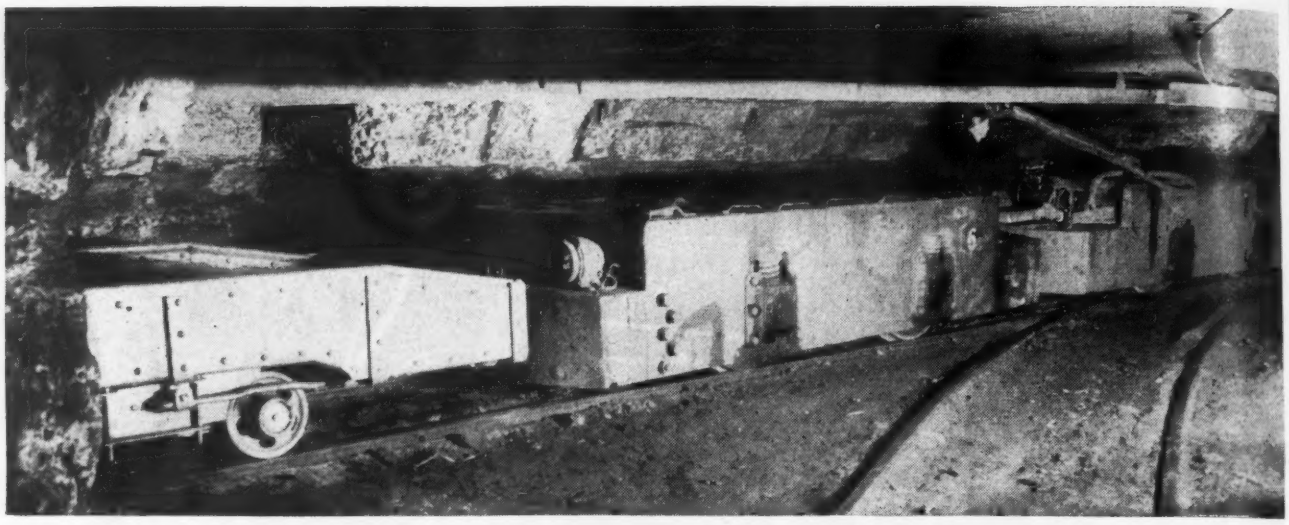
Part of the tonnage is handled by three General Electric 40-ton tandem units (each made up of two 20-ton No. 816 locomotives). These permanently coupled units came equipped



This installation of motor (*A*), pump and tank (*B*), accumulator (*C*), pressure gage (*D*) and control valve (*E*) in one deck handles the brakes of both the 10-ton locomotives making up the tandem.



Motorman sits in the cab at the left and reaches back to the brake control valve on the bumper. The electrical power cable group for the traction motors has been installed with a crossover at the center and the whole suspended by tension coil springs, thus providing flexibility and minimizing chafing of the insulation. Arrows point to the 4/0 bond welded between the bumpers.



The quick, smooth, positive action of the hydraulic brakes on these tandem locomotives has speeded haulage, made it safer and cut locomotive maintenance.

with air brakes, which do a good job. Other trips are hauled by eight General Electric 20-ton tandems (each of two No. 711 locomotives). These old locomotives had manual-type handwheel and thread-bar brakes. Considerable thought was given to selecting a power brake to replace them. An air brake would require a space 24x30x20 in. for the compressor and space for an air-pressure storage tank 16 in. in diameter and 5 ft. long. These spaces were not available but it was found that there was sufficient space for hydraulic braking equipment. In 1940 four hydraulic brakes were installed. Experience with them was favorable, so in 1942 eight more of a new model (Type A-1 Westinghouse) were purchased.

The principal elements comprise an oil pump, sump and motor, all built as one compact unit requiring a space 14x16x36 in. An oil accumulator and switch control requires 10x10x30 in. and the control valve is small enough so that it can be mounted on top of the bumper. Brake cylinders also are relatively small and can be installed between brake hangers. Other items are a pressure gage, contact switch for the motor, coupling tubing and hose.

Maximum oil pressure is 800 lb. per square inch. When a drop to 500 takes place the pump restarts. The accumulator, which contains a piston-backed compression spring, stores oil under pressure. Part of this accumulator is a surge tank for the oil which returns when the brakes are released. From this tank the oil drains to a sump in the pump unit. On the end of the accumulator is mounted the pressure control switch operated mechanically from a small piston.

Pumping unit and accumulators are installed in the deck of one of the locomotives constituting the tandem unit. The pump is mounted on the bottom plate and as close to one end as possible. The accumulator is mounted in the other end of the deck at a higher level so oil will drain to the pump. This spacing allows room for refilling with oil and for maintenance of the pump unit. The control valve, mounted on the bumper of the same locomotive, is in easy reach from the operating cab of the other locomotive. One-fourth turn of the control lever applies the brake full force. Gradual application is made by moving the lever about one-eighth turn.

Control switch and pressure gage are mounted on the side plate of the deck so they are in plain view of the operator. Steel tubing, $\frac{3}{8}$ in. in outside diameter, connects the pump, accumulator and operating valve and is used along the side of the locomotive frame to within a few inches of the brake cylinder. Because the cylinder has some movement, a short piece of high-pressure flexible rubber hose is used to complete the connection. Tubing together with ells, tees and unions were furnished with the brakes. Flared-type connectors are used. Since no threading of tubing was necessary and the steel tubing could be bent easily to conform to the angles necessary, installation was a simple matter. Oil is conducted between locomotives by a piece of $\frac{1}{4}$-in. high-pressure hose 24 in. long.

To protect against stray current which would pass through and destroy the reinforcing wire in the hose, wheels and track must not be depended upon for an electrical connection between locomotives. There must be a continuous high-capacity electrical connection that is never broken. Welding a loop of flexible 4/0 copper bonding cable between bumpers will do the trick.

Control for the pump motor consists of a snap switch combined with a built-in overload relay to trip that switch to the off position in case of trouble. A fuse provides protection against a short circuit.

To protect parts from mechanical damage, removable covers were made for the accumulator and pump units. Steel shields also were placed above the pressure gage and control switch.

If a hydraulic brake added to a locomotive is to be effective it is necessary that the original brake mechanism—that is, hangers, links and so on—be put in excellent working condition. With the new installation the thread bar and handwheel are left on the locomotive to be used as an emergency brake. This requires the use of chains as the connection between the equalizing bar and brake hangers.

Where this A1-type hydraulic brake is correctly installed it will give good service with reasonable attention to maintaining proper adjustment. Like all brakes, it will require some maintenance, such as renewal of cup leathers in the accumulator, replacing contacts on the pressure switch, replacing brushes in the motor and checking oil lines and connections for leaks caused by vibration and movement.

In addition to the purchase price of this brake, installation cost will be about $125, assuming that the locomotive brake mechanism is already in good shape. Over a period of years the total cost will be offset by the savings in locomotive maintenance, however, and safer operation and faster haulage alone may justify the investment.

The Real Meaning of John L. Lewis' Demands

★ TO COAL MINING

★ TO ALL INDUSTRY

WHEN JOHN L. LEWIS demanded March 1 that the coal operators of the United States pay tribute of 10c. a ton to the United Mine Workers of America, he probably was well aware that he was expounding a philosophy having profound and sweeping implications not only for coal mining but for all other industry and the public as well. In effect, that philosophy is an extension of the class war beloved of the New Deal and could end only in the reduction of labor from its status of a partner in the progress and prosperity of industry to that of a tribute-levying aggregation neither knowing nor caring what happened as long as money could be wrung out of industry and the public.

If Lewis should be successful in his raid on private capital, no other labor leader in the United States would dare not to attempt the same maneuver. With war chests which such private levies would make possible and in view of the known ambitions of the various groups of labor leaders, it is no exaggeration to see a period of labor warfare that might mean the destruction of private enterprise as it is known today. With it would come the destruction of the labor movement and restriction of the freedom of workers as a result of the government regimentation which such warfare for the control of organized labor inevitably would entail.

What is this new concept of compelling industry, and through it the public to finance the ambitions of labor czars? How did it start? Why is it permitted to flourish? What does it mean to coal mining, to other industries, to labor and to the public? Those questions and many others demanded answers as soon as Lewis had stated his position.

To take first things first, just what did Lewis ask? Aside from payroll adjustments concerned mainly with trying to outflank the Little Steel formula, his main demands included the following:

That the coal operators be compelled to contribute a "royalty" of 10c. a ton to the United Mine Workers, to be administered by it as a fund to "provide for its members modern medical and surgical service, hospitalization, insurance, rehabilitation and economic protection."

That either party be able to terminate the wage agreement, not at the end of the usual two years, but on 20 days' notice.

That all employees, except the superintendent and one mine foreman at each mine, be included under the contract.

That it shall not be a violation of the agreement for

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Power for Lewis or Welfare of the Miners?

John L. Lewis' demands, on their face, would seem to mean one thing. But do they? Is it possible that his real meaning is that set out in the right-hand column below, even though these are not his actual words?

THIS IS WHAT LEWIS SAYS HE WANTS	*IS THIS WHAT LEWIS REALLY WANTS?*
A royalty of 10c. a ton paid by the operators to provide "modern medical and surgical service, hospitalization, insurance, rehabilitation and economic protection" for the miners.	**"I want management to pay dues to the union so that I can build up a fund over which I alone will have control so that I can finance the organization of other industries and make myself the No. 1 labor leader in the United States."**
"The term 'mine worker' as used in the basic agreement and all district agreements shall include all persons employed inside or outside of the mines, except the superintendent and one mine foreman."	**"I want to block all possible avenues of communication between management and worker and I want management to have less and less voice in the conduct of its operations."**
"A provision requiring employers to furnish union-made tools and explosives shall be inserted."	**"I want one more lever to organize other industries. If manufacturers supplying the coal industry don't recognize my union, I'll pull a coal strike and we'll see how fast they come to terms."**
"Penalty clauses [against the operator for lockouts and against the union for illegal strikes] in all districts shall be eliminated."	**"I don't want to be hampered by such old-fashioned notions as responsibility for living up to a contract. If we feel like striking, we'll strike and we won't pay any damages just for a little matter of breaking our pledge."**
"It will not be a violation of the wage agreement for the mine workers to cease work to prevent shipment of coal to a consumer whose employees are engaged in a legal strike."	**"I want a dagger to hold at the back of any industry using coal. If other industries refuse to recognize me, a couple of my boys will form a picket line, we'll call a 'legal strike' and I'll cut off their coal. That will bring them around."**

the miners to cease work to prevent the shipment of coal to any consumer whose employees are on strike.

Even a cursory study of the demands immediately reveals the pattern: namely, that Lewis is concerned not so much with improving the lot of the mine workers as he is with providing for himself both the money and the weapons for seizing control, probably through District 50, of labor in those fields wherein up till now he has had little success, notably the chemical industry, agriculture and supervisory and office workers.

But before analyzing the demands, it is more important to understand fully, and perhaps even at the risk of repeating already oft-stated facts, the circumstances which lead a supposedly responsible union to make such demands in a serious negotiation. Two main facts set the stage for Lewis' demands: (1) Lewis himself is a skillful opportunist, and (2) the nation is entering its 13th year of a confused and hybrid labor policy or lack of policy which sees a hurried and cynical confession to belief in private enterprise every fourth November, and sanction and even encouragement of the most tyrannical union methods, including the legalization of highway robbery, the rest of the time.

Once James Caesar Petrillo had successfully thumbed his nose at the President and held up the record-making companies for tribute, it took no deep insight for anyone who knew Lewis to forecast that the head of the United Mine Workers would follow that example at

the first opportunity. It simply was too good to miss. If Petrillo could get away with it, why not Lewis? And who was there to stop it? Some members of Congress had viewed with alarm, but most had done nothing. The President had said there probably was a law to stop Petrillo, but that he, the President, couldn't find it, and if he couldn't, who could? The President had asked Petrillo "please" and Petrillo had answered "nuts," and that was that.

Twelve years of New Deal coddling of labor leaders; of hydraheaded, muddled labor bureaus, commissions, boards and administrations; of open hostility to industry and equally open paternalism of labor had given any labor leader, no matter how alien his viewpoint, assurance that he had nothing to fear from government in trying some new high jinks against management, labor and the public.

Gain For Lewis—Loss For Miners?

The coal industry, its employees and the public which they serve are for the moment those primarily concerned with this new concept of making industry pay for the jurisdictional disputes of labor leaders. All three, in one form or another, would be taxed to finance Lewis' ambition to become again the dominant figure in organized labor in the United States.

Through the clause in the proposed contract which would permit sympathy strikes by coal miners, Lewis, if successful, would forge his most powerful weapon and would be able to wield it to rectify what so far has been an organizational failure. Where his District 50 organizers heretofore have met with indifferent success or downright defeat in invading industries either unorganized or organized by the A.F.L. or C.I.O., Lewis would now, by yanking the coal miners off the job, be able to choke off their supply of fuel or raw material and bring them to their knees.

By insisting that supervisory management be included in the contract Lewis is invading the proper realm of management, attempting to organize employees who in many cases have shown a firm determination not to be organized and who in some instances are actually designated by law as company and State representatives, charged with the protection of life and property.

If Lewis were to gain his objective of 10c. a ton for every ton of coal mined, he would have access to a huge fund over which, in fact if not in sugared statement, he alone would have control. In wartime such a fund would amount to more than $60,000,000; in peacetime to anything over half of that sum, provided the rate were not raised, which it probably would be. No matter for what purposes Lewis publicly says the fund would be used, the fact remains that it COULD be used to organize other industries, for political purposes or for anything covered by the sweeping generality of "economic protection."

But granting the improbable and supposing that it were used exclusively for the miner's benefit, what would it mean to him? At its maximum, the fund would represent between $130 and $150 per miner per year, or around 20 days' normal wages. If coal were used as a lever by Lewis to organize other industries, strikes necessarily would be frequent and 20 days' work and more easily would be lost by the miners over the course of a year.

More than that, however, would be the direct impact on the industry of public resentment and dissatisfaction at interruptions of supply, continued uncertainty and higher prices. The public has a choice where fuels are concerned, and if they do not like one, they can buy another—or at least enough of another to deal coal a body blow. Such a royalty fund—in addition to the increase in costs imposed by other demands—would certainly raise the price of coal and rob it of one of its most potent market weapons, its economy. Some operators have estimated that the total of Lewis' demands would raise production costs $400,000,000 a year. Whether that be accurate to the cent or not, the fact remains that granting of the demands would mean either an increase in consumer prices or, if the government failed to allow that, economic distress among producing companies which would sooner or later make its effect felt directly on the miner.

The economic position of the miner always has and will continue to be served best by a healthy, prosperous industry able to assure uninterrupted service with a low-cost product rather than by a tax which is in itself a poor substitute for steady work at good wages.

If it be true that there exists a need for additional "modern medical and surgical service, hospitalization, insurance [and] rehabilitation," there seems to be no reason why, where the need is shown, the money cannot be raised by methods already in operation and spent under the regular controls, rather than by a royalty paid into a union treasury. Such services already are the objectives of existing compensation acts and of company or joint welfare, medical service and insurance programs.

"Economic protection" of the miner, the joker in the royalty clause, is linked inevitably to the welfare of the industry. Unless the industry prospers, there can be no "economic protection" for anyone, miner or operator. Lewis is shrewd enough to know that. From bitter past experience he knows that a faltering coal industry means a weak, decimated and divided miners' union. If, as he states, he is truly concerned with the miner's "economic protection," then his energies would be directed more properly toward the preservation of efficient management and to a due regard for the production costs and the competitive position of the industry.

More Union Warfare—or Less?

Vital as all these considerations are to coal, the implications of Lewis' newly expressed concept bore

even deeper into the affairs of all other industry and of the public.

First and most obvious is that everyone—industrialist, railroader, homeowner alike—will have to pay more for coal and will be subject to more interruptions of service if Lewis is able to steamroller his demands through. What effect the wage increases and the royalty demand will have on other industries in which labor leaders will unquestionably seek to duplicate or surpass them is anyone's guess, but one sure result is that they will do the buying public no good.

All these factors are of grave importance. But it is not until the vast fields which have been opened by this new philosophy are thoroughly explored that the full impact of Lewis' demands can be realized. If they are met, it seems inevitable that they will be followed almost at once by the most destructive and costly fight for control of organized labor this nation has ever seen, all financed by industry, which means paid for ultimately by the consumer.

It is well known that Lewis burns with a desire to secure for himself again the dominant position in labor which he once held with the A.F.L. and the C.I.O. Lavishly financed (by the operators through the royalty), equipped with a weapon which can force other industries to recognize his power (denial of fuel or raw material), he would be certain to move in quickly on ground now staked out by either of the other two labor groups.

Neither the A.F.L. nor the C.I.O., it may be assumed, would take kindly to such a maneuver. In fact, one New York local of the C.I.O. already has asked the government to take over the mines to prevent a coal strike. Certainly the will to fight Lewis would not be lacking and the means to get the money would be at hand. What, for instance, if Lewis had his way, is to prevent the United Automobile Workers from demanding $10 an automobile as a royalty? Or the Brotherhood of Railroad Trainmen from asking 1c. per ton- or passenger-mile? Of the textile workers from asking 2c. a yard, the steel workers 50c. a ton, the Newspaper Guild 1c. a copy, or the teamsters $2 a round trip?

With these huge slush funds available, all under the solemn name of "economic protection," the three major labor groups could and probably would fight each other tooth and nail for jurisdiction in every major industry. The immediate result would be confusion, distress and unquestioned crippling of the war effort. That, obviously, would mean the widespread seizure and operation by government, not of the unions, which were the cause, but of the private properties, which were the victims.

But beyond that immediate consequence lies a prospect much more forbidding. The continuation of a bitter three-way labor war would do little to promote the orderly and profitable progress of industry, business or commerce. It would provide the government with a logical excuse, if this government needs one, for the complete regulation of all private enterprise. No government could long afford to tolerate continued interruption of essential service, in peace or war, and no government, forced to take over industry, would put up with defiance and interruptions of work. That is simply another way of stating that the government would have to step in and take full control of workers and of properties.

The end result of such a debacle, for coal, for other industry and for labor, would be the substitution of government regimentation under which no one, including the public, can benefit, for sound cooperation between men and management under which all can benefit.

Where Does the Answer Lie?

What is needed, even at this late hour, to get back on the right road? The answer is relatively simple in the statement, apparently all but impossible in the execution. If union leaders cannot be made to understand the true meaning of cooperation between management and labor, then legislation must be enacted to curb their growing and virtually unlimited powers. That would require a hitherto undemonstrated vision and courage on the part of the Congress and an almost complete reversal of thinking on the part of the New Deal.

Needed along with such legislation is a labor policy which has as its basis true collective bargaining which not only prevents the exploitation of the worker but means the unfettering of management from the restrictions of orders, directives, reports, espionage and downright persecution. Such a policy envisions competent personnel in streamlined and efficient bureaus, responsible to one authority and governed by written law rather than personal caprice. If the New Deal refuses, as it has to date, to install such a policy, then the Congress, which represents the people, must take a hand in forcing it.

But even more fundamental than laws and policies is education—education of labor and public alike in the fundamentals of the American system of free enterprise, the truth that there can be no benefits for either labor or management unless there also is true cooperation, respect and understanding. In the last analysis, that probably is the job of management, which stands to lose the most if the lesson is not learned. It means not only persistent and skillful public relations but enlightened and sympathetic labor relations as well, even though at times such as this the pursuit of such a program might well tax the patience of a Job.

CUTTING COST

In Anthracite Preparation Maintenance*

Rubber Pipe and Special Rubber Valves Handle Coal and Sand in Water as Well as Coal Alone—Their Use Materially Lowers Cost of Maintenance—Other Special Equipment and Materials Employed

By JOHN S. JOHNSON

Superintendent, Preparation and Maintenance
The Hudson Coal Co.
Scranton, Pa.

THE MAINTENANCE COST, or renewal cost, in any preparation plant is a large item of expense and reflects in the total cost of producing and preparing the coal. It is given constant study to the end that ways and means of controlling and reducing this proportion of the total cost may be developed.

Study of this item of cost has proceeded along usual lines, which are: proper functioning of the maintenance organization; systematic and thorough inspection to prevent breakdowns; the making of repairs before renewals are needed; maintenance work done thoroughly the first time, instead of patching; study of parts needing frequent renewal or repairs or conditions resulting in delays; thorough knowledge of cost by the man responsible for maintenance; and the use of special equipment and materials.

This paper is to deal with special equipment and materials to reduce the maintenance cost, but before going into that I want to express an opinion on the general subject.

Maintenance Organization

Usually maintenance is taken care of by a group of men who perform their work on the off shift. The work is arranged by the operating official who should be thoroughly familiar with maintenance, so that materials needed may be made up for the particular job and waste of time in looking up materials be prevented.

To perfect the maintenance organization, all operating attendants should be thoroughly trained to be familiar with all working parts of their equipment, to make a thorough inspection and to write out the slip for the work required. This requires job analysis, but it is worth the effort, because the attendant usually is better informed than anyone else about his particular equipment. The operating official can judge the scope of the work preliminary to directing the repair and having material ready.

Lubrication is an important item in maintenance and a subject by itself. Usually the breaker oiler is designated to perform this task. This man should be picked for ability and put in line for promotion to machinist. He should be trained as an inspector, as he is constantly visiting most parts of the breaker and has an opportunity to observe where maintenance is needed.

The first thing is to lay out maintenance work and arrange to have it done. The next is to check the work and see that it has been properly done. This check should be made by the operating official and through the attendant.

The cost statement showing the various items of maintenance cost often is not understood by the man in direct charge. Cost sheets should be simplified and worked up by breaker sections; e.g., the cost of delivering coal to the top of the breaker, the upper section taking in shakers, main rolls and feeders; next, secondary rolls and shakers, cleaning appliances, etc., etc. Operating or maintenance officials usually do not have time to go over cost sheets and, moreover, the statements are too complex; but if given the cost by sections, those in charge can very quickly see the cause of any increase in cost. These men may require some training and education, but they are spending the dollar. It is worth while to educate them in cost analysis.

I feel that a study should be made

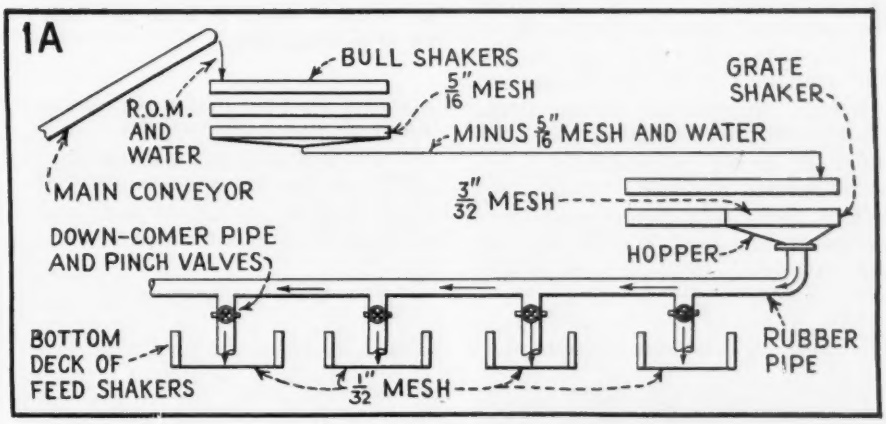
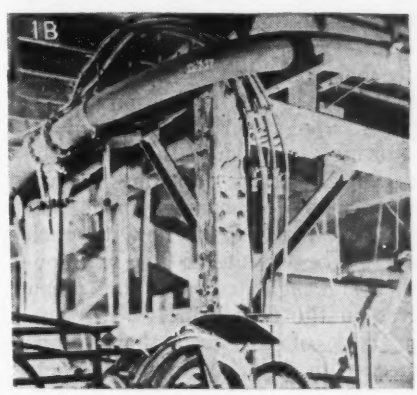


Fig. 1—Use of rubber pipe in connection with flow of coal.



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of the method of handling maintenance work and a practical system planned to reduce costs by improving the organization.

This paper will deal with the use of rubber pipe, rubber pinch and angle valves, tile and the new type of slate gate on Chance cones.

Rubber Pipe in Breakers

Figs. 1A and 1B show the use of rubber pipe in connection with the flow of coal; i.e., run-of-mine is washed from railroad cars into the main intake conveyor, which delivers the raw product to the bull shaker, or the uppermost shaker in the breaker.

The water and a large part of the fines contained in the run-of-mine are removed through the bottom deck. Chutes are used to divert the fines and water to the grate shakers at the next lowest elevation, which are dressed with ⅜-in. round-mesh perforated jackets, and remove the silt and water that found its way to the Dorr thickener for reclamation.

This silt was needed for boiler fuel. The most logical place to capture it was on the four sets of feed shakers at a lower elevation, two floors below. The problem of diverting this quantity of water and solids was simplified by the rubber pipe that ran from the grate-shaker hopper to the feed shakers. The fact that rubber pipe lends itself to long-radius turns permitted the turning to go across the rear of the four sets of shakers. Openings at each shaker, with downcomers, made possible the diverting of flow to each shaker. The volume of flow was controlled and regulated by rubber pinch valves on the downcomers. The bottom deck of the feed shakers was dressed with ⅜-in. round-mesh jackets

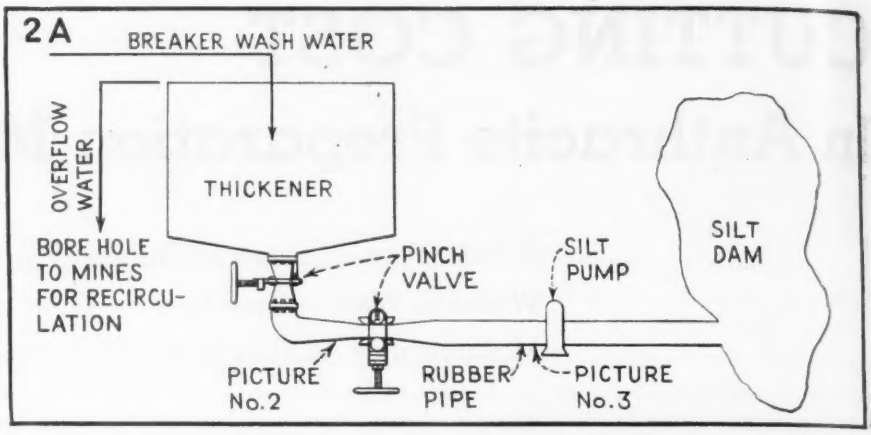


Fig. 2—Pinch valves in place on underflow of thickener tank.

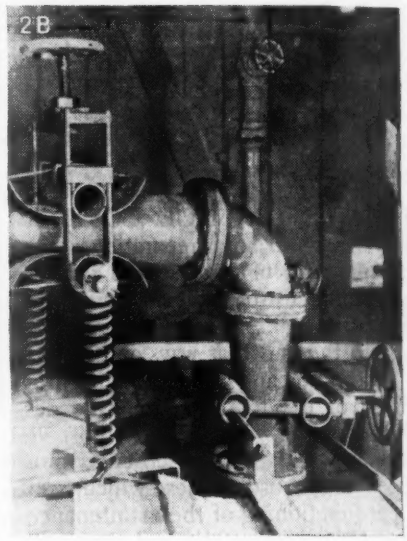
to remove the fines that are objectionable in silt fuel.

This rubber pipe was installed Dec. 7, 1937, and has been in service 9,200 hours. It shows no sign of wear, and has required no maintenance.

Pinch Valves

Pinch valves can be used with flexible rubber pipe as shutoff or regulating valves. Figs. 2A and B show the pinch valve in place on the underflow of the 60-ft.-diameter Dorr tank, and also a continuance of the rubber pipe from the pinch valve to silt pump.

Before the rubber pipe and pinch valves were installed, a bell and spigot line and two cast-iron valves were in use. The valves and pipe, on an average, gave three to four months' service. The valve directly underneath the thickener was used as a shutoff. The lower valve was used for regulating the flow of water so that sufficient water would overflow the thickener to be passed down through boreholes for



recirculation wash water for the breaker. In throttling down the flow, the seat wore out, and to shut off the tank the second valve was needed.

This arrangement was replaced by an arrangement of rubber pipe and pinch valves on Jan. 10, 1933. It is still in operation after 57,205 hours of service. It has required no main-

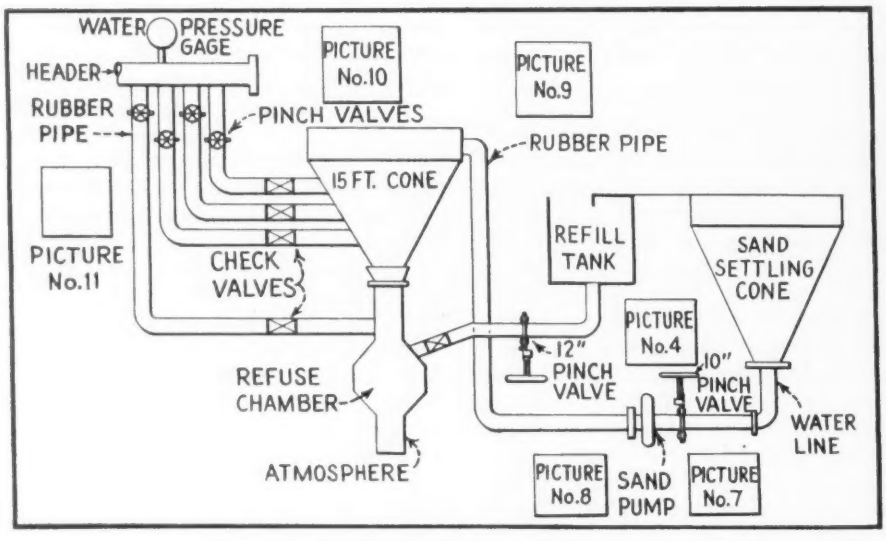


Fig. 3—Rubber pipe and pinch valves as used in cone operations.

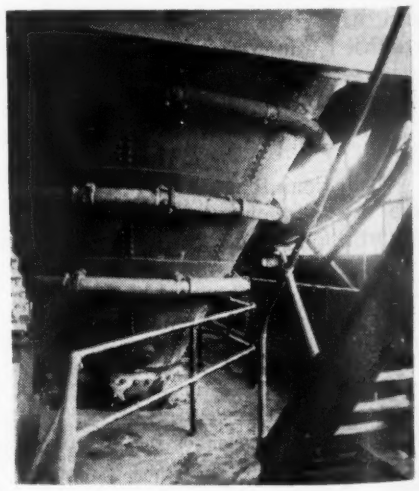


Fig. 4—Rubber pipe supplying agitation water to cone.

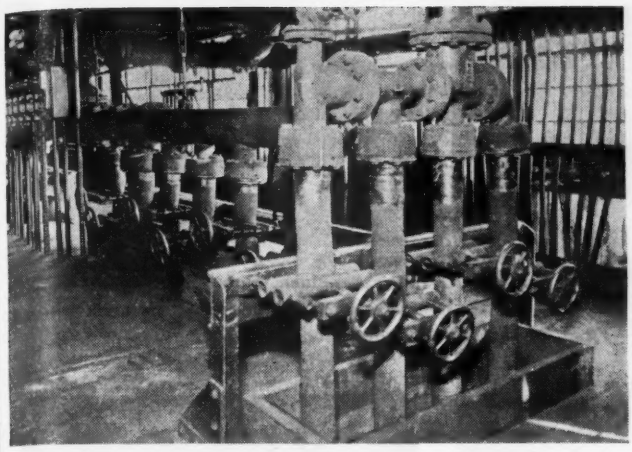
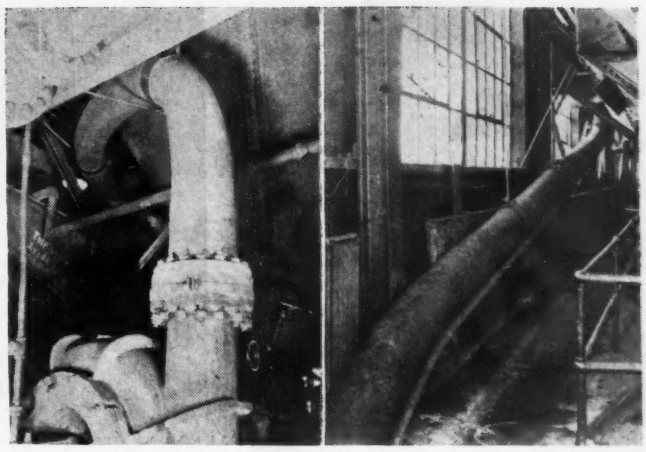


Fig. 5—Rubber pinch valves controlling volume of agitation water.



Figs. 6 and 7—Rubber pipe between sand pump and entry to cone.

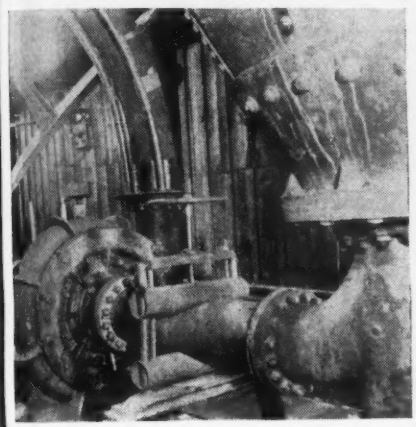


Fig. 8—10-in. pinch valve between sand pump and settling cone.

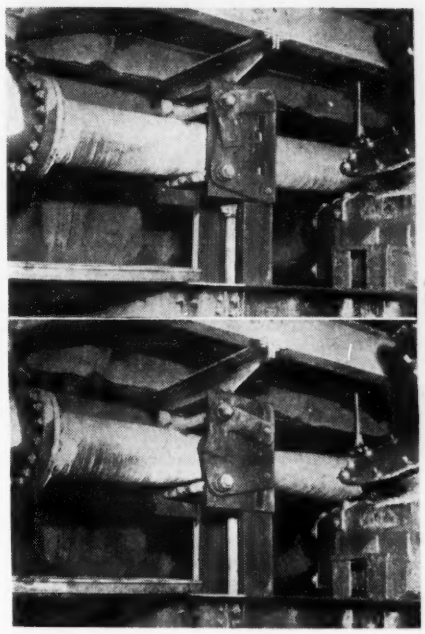


Fig. 9—12-in. pinch valve for control of water for refilling refuse chamber (top, open; bottom, closed).

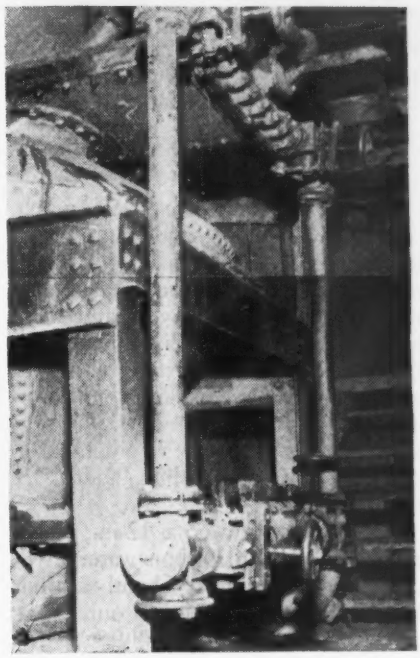


Fig. 10—Flat slide valve for keeping valve free of sand.

tenance and shows no sign of wear, and while two rubber pinch valves were installed, only one valve is used, as it was found that the pinch valve acted as a shutoff and regulating valve.

The cost of installation of cast-iron line and valves was $264.15. The rubber pipe and valves cost $329.45. The actual cost of maintenance, including labor, for cast-iron pipe and valves for a period of 21 months of double-shift operation, or 5,136 hours, was $523.29. This shows that up to the present time the life of rubber pipe and pinch valves is 11 to 1—the rubber pipe installation not showing any sign of wear and giving promise of lasting indefinitely.

Rubber Pipe and Pinch Valves in Cone Operation

Fig. 3 shows the location of rubber pipe and rubber pinch valves in the flow of sand and water. On this sketch some of the following figures are located.

Fig. 4 shows a rubber pipe supplying agitation water to the cone. The downcoming pipes from the header hook onto the manifold of the top, bottom and center spray inlets. The connection is made by using a tee and a screw plug in one end of the tee. It permits cleaning of the spray if and when it becomes blocked, which eliminates dumping of the cone with its attendant disadvantages.

Fig. 5 shows rubber pinch valves at the cone operator's station, controlling the volume of agitation water. The wheels on these valves are marked so that the operator can open each one the required number of turns. The quantity of water is recorded by the operator in his daily record book, by hours. The water pressure from a gage on the header also is recorded. In another column, record is made of hourly sink-and-float tests of the final refuse. Any delay, and its cause, also is recorded.

From the maintenance angle, this arrangement of rubber pipe and valve does not require any repairs. There are no leaks. From the operating standpoint, the arrangement tends to insure consistent operation.

Figs. 6 and 7 show a rubber pipe between the sand pump and the entry to the cone. This pipe carries all the sand for recirculation. Before the introduction of rubber pipe, cast iron was used, the line being made up of a considerable number of elbows to make the turns between the sand pump and the cone. Rubber pipe eliminated these, as it can be turned on long radius and can be hung or supported. No maintenance is required with this arrangement.

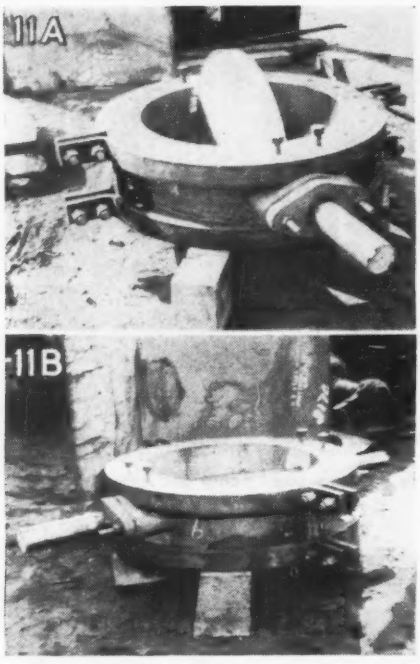


Fig. 11—Slate gate: A, open; B, closed.

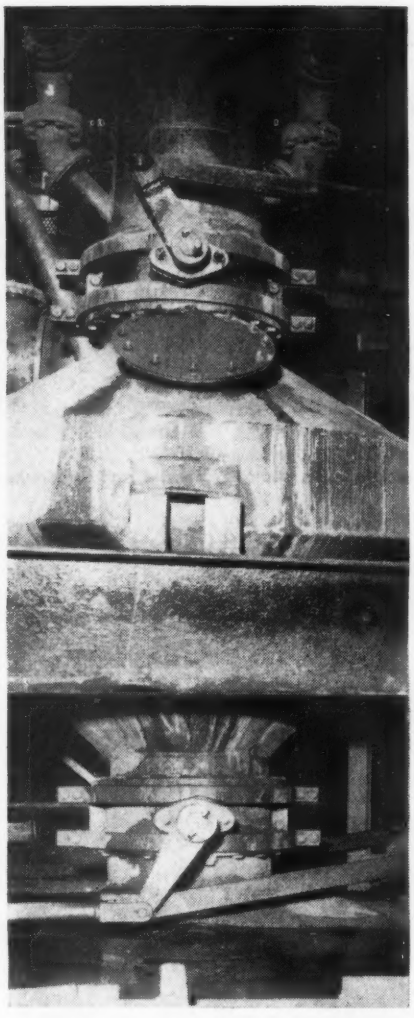


Fig. 12—Slate gate in place with operating mechanism.

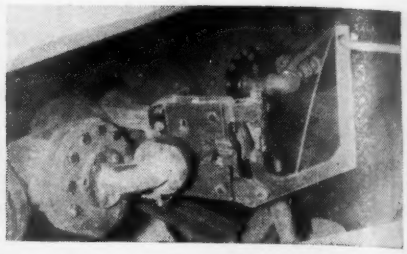


Fig. 13—Pinch valve on water line supplying water on lip screens as coal is being loaded into railroad cars.

Fig. 14—Pinch valve attached to dam inside mine.

Fig. 8 is a view of a 10-in. pinch valve between the sand pump and settling cone. This replaced a cast-iron valve that was a continual source of trouble because of wear and hard opening and closing. This pinch valve requires no maintenance. It also acts as a section of pipe and is an indicator of blockage at the bottom of the settling cone. If blocked, the pinch valve collapses. Water is then added to start the flow.

Fig. 9 is a view of a 12-in. pinch valve used to control the water used for refilling the refuse chamber after the refuse has been trapped out. This valve is worked automatically with the opening and closing of the bottom slate gate. It replaces the quick-acting metal valve used for this purpose and has effected a considerable saving in maintenance, not only in renewals but in continual repairs made necessary by the severe service. The rubber pinch valve is more positive. There are no working parts. The valve also acts as a section of pipe.

Maintenance of Slate Gates and Water Lines

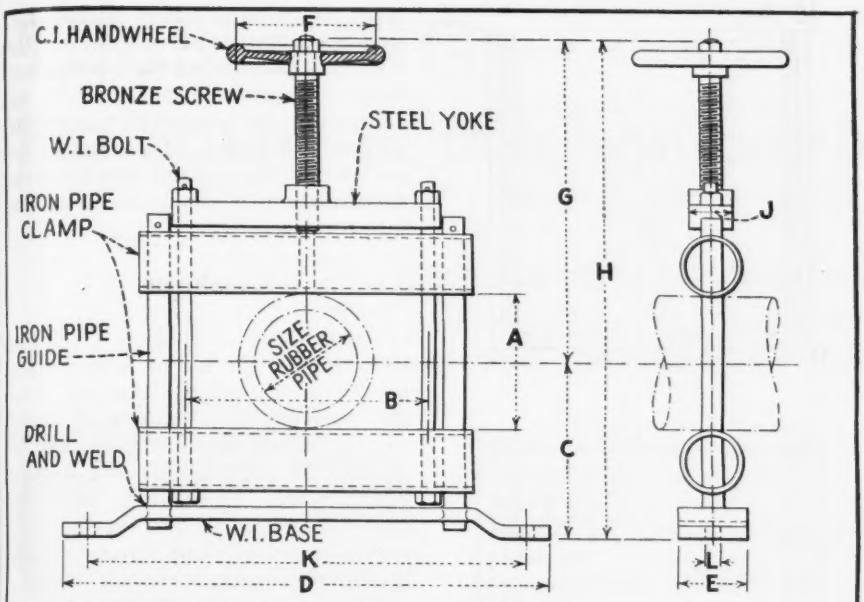
Operation of the flat slide valve with its network of water lines is costly, because of wear on the valve from the action of the sand and the necessary renewal of pipe work and valves. The wet condition resulting from leakage and delays caused by tramp iron are unpleasant. The slide valves keep the valve free of sand (Fig. 10).

Maintenance of these lines has been under constant study. The first step was to replace the metal valves with pinch valves. The slide valves were repaired by welding to them liners that had been removed to bring them back to their original size. Finally, we perfected a new type of gate.

This gate is round and can be made to fit any size of cone. It operates from the same mechanism that operated the first slide valve. The casting in which the gate operates is split and fits in between the classifier column and the refuse chamber. The casting is 9 in. high, ribbed, bolted and reinforced by steel bands around the flange. The gate itself is made in two parts, each 2 in. thick, welded to the shaft that runs through the center of the casting. The latter is mounted on stuffing boxes to prevent leakage of water. Fig. 11A shows this valve in "open" position; Fig. 11B, in "closed" position.

The operating mechanism is made up of two arms connected to each end of the shaft. These arms are connected to the steam cylinder. When opened, the gate makes a quarter turn (about 90 deg.), the refuse sliding by each side of the gate. This has resulted in a large saving in maintenance, as there is very little wear on the gate itself. There are no water lines, no delays to operation from gates sticking, the gates are easier to change when necessary and require only about half the former pressure to operate. This type of gate, together with rubber pinch valves operating to refill the refuse chamber, makes a complete job that is cleaner than any previous installation, as it has eliminated leaking, requires less maintenance and is easier and cheaper to renew or to maintain. Fig. 12 shows this type of valve in place with the operating mechanism.

The cost of this butterfly valve is $87.39, including the shaft, welding the gate to the shaft, and keyseating. The cost of the casting in which the valve operates is $89.60, or a total cost for valve and chest casting of $176.99. By comparison, the flat slide valve costs $49.50 and the valve chest $184.89; or a total cost of $234.39. The labor charge for renewing the flat slide valve and chest is approximately $60; the labor charge for renewing the new type of butterfly valve will be



SIZE	A	B	C	D	E	F	G	H	J	K	L
2"&2½"	4 7/16"	7"	6 3/8"	20"	2 3/4"	6 3/4"	13 15/16"	20 5/8"	2½"	17½"	11"
3"&4"	5½"	11"	7½"	25"	3"	8"	16 3/16"	23 11/16"	2½"	22 1/4"	13"
5"&6"	7½"	14"	9 11/16"	28"	4"	8 BOLTS 10 FOR 6	20 9/16"	30 1/4"	2½"	25 1/4"	13"
8"	9 5/8"	17"	12 1/4"	33"	4½"	13"	25 1/4"	37½"	3"	30¼	15"
10"	12"	20"	14 5/8"	37"	5"	13"	29 11/16"	44"	3"	34"	15"
12"	14"	24"	15 5/8"	42"	5"	13"	32 3/4"	48 3/8"	3"	39"	15"
14"											
16"											

Fig. 15 — Dimensions and mechanism of pinch valve.

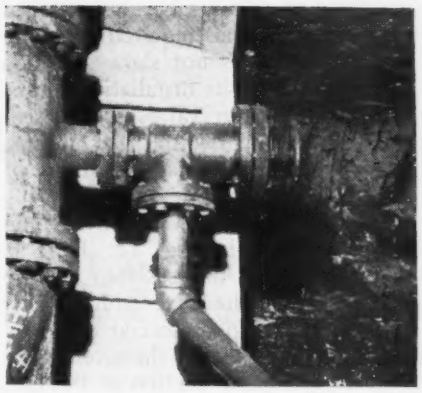


Fig. 16—Rubber-lined corrosion-resisting plug valve.

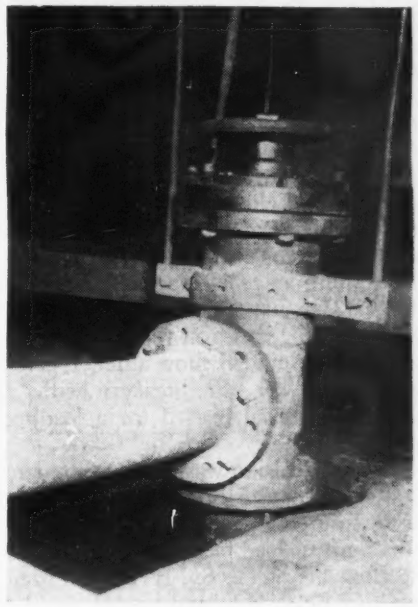


Fig. 17—Plug valve at river sump, controlling one suction to pump.

about $20. The chest casting will not need renewal.

Not included in the cost of the butterfly valve are the arms and the framework that supports the operating mechanism. This is considered as a capital charge. The cost of the casting in which the new type of gate operates is considered as a capital charge, which would have a direct comparison of $87.39 for the butterfly arrangement against $234.39 for the flat slide valve and chest.

It was necessary to cut off about 9 in. of the classifier column of the Chance cone to install the new gate.

The comparison of length of service remains to be proved. We believe that we will get considerably more service from the butterfly type. We also have eliminated the use of water on these valves, which is a large maintenance item for renewing and repairing pipelines. Regarding the operation of the valve, there is no comparison, as the butterfly is simple and there is no blockage or delay.

Other Uses For Pinch Valves

Fig. 13 shows a pinch valve installed on a water line supplying water on lip screens as the coal is being loaded in railroad cars. These pinch valves are being installed as the quick-opening lever valves wear out. The illustration shows one of these lever valves next to the pinch valve.

Installation of pinch valves at this point is eliminating considerable maintenance. Continual opening and closing of quick-opening valves causes them to wear out and leak, necessitating their renewal. The pinch valves insure positive shutoff with no maintenance. The elimination of leaking valves at this point saves water, which can be used throughout the breaker.

The mechanism for operating a pinch valve in this service is shown in the figure. It is operated by extending a rod from the valve to the loading platform.

In Fig. 14 a pinch valve is shown attached to a dam inside the mines. This dam acts as a reserve sump for three separate pumps and their sumps. The volume of flow is controlled by the pinch valve. This arrangement permits the storing of water, which allows the pumps to be operated together or singly, depending upon power requirements and water flow.

The gate valves used in this service required continual maintenance, as the acid content of the water corroded the seat. The pinch valve was installed in 1933, has required no maintenance, and shows no sign of wear.

A drawing of a pinch valve, showing dimensions and mechanism, appears in Fig. 15.

Another type of valve being used is the Johnson corrosion-resisting valve. This device is a rubber-lined valve so designed that it can be used in pipes that are under a negative pressure as well as in those that are under a positive pressure. Its novel feature is that the parts of the device that come in contact with the water, or other fluid flowing through it, are entirely of rubber, and therefore are not subjected to action by acid. Another novel feature of this valve is that the metal parts, required so that the plug part of the valve may move back and forth, are protected from acidulous fluid whether the valve is open or shut. Still another feature is that it requires no packing for the valve stem. Packing and packing glands always have required more or less maintenance. Therefore this valve, after installation, requires no maintenance.

Fig. 16 shows the Johnson valve at the bottom of the column line at the foot of the shaft, being used for drain-

ing this line. This valve was installed Sept. 26, 1941; has required no maintenance and does not show any sign of wear. Before its installation, brass-mounted cast-iron valves were used. These lasted only two to three months, because of the high acid content of the mine water.

Another type of service for the plug valve is shown in Fig. 17. Here it controls one of the suctions to the Nye pump at the river sump. This sump is made up of several compartments, through which the river water flows to the pump suction at the end of the sump. The division plank in each compartment acts as a baffle, the dirt flowing with the river water collecting in the compartment.

One Nye pump is used for each compartment. The last pump has four suctions to cover the entire area of the compartment. Valves are installed on each suction, so that each can be operated as a separate unit. This requires opening and closing of valves throughout the day's operation, which causes undue wear of any valve. The rubber-lined plug valve is especially adapted to this type of service and is being installed as the cast-iron valves wear out.

Figs. 18A and B show a new type of storage pocket for breakers with a 16-in. pinch valve used for a loading gate.

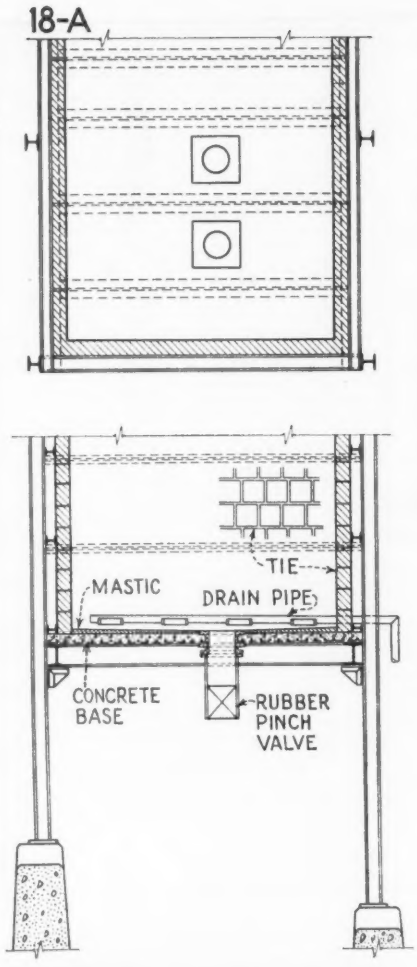
When decision was made to prepare No. 4 and No. 5 buckwheat, a pocket was required for storage. This pocket was built of load-bearing tile. The tile sections are 4-cell, 8x12x12 in., glazed on the 12-in. side and scored on the other side. The tile are supported by steel framework. The pocket is square and has a flat bottom made of reinforced concrete covered with 1½ in. of Flint-Coat protection.

After cleaning, the No. 5 buckwheat passes over a screen for dewatering. From this screen the dewatered product passes to the tile pocket. The water remaining in the coal as it is stored in the pocket is removed through drain pipes on the bottom of the pocket. There has been no maintenance on this pocket since it was installed.

The 16-in. valve used as a loading gate is installed on the bottom of the pocket. Fig. 18A shows the operating mechanism, which is extended by lever to operate the opening and closing from the loading platform. This is an innovation in loading gates. It has proved entirely satisfactory and has required no maintenance.

The tile is being used also for chute lining, hoppers and slopes of market pockets. For chute lining and hoppers, 9x18x1¼-in. flat glazed vitrified tile is used, glazed on one side, scored on the other. This is used in connection with steel chute work and hoppers and makes a permanent installation. Sand and water flowing over it do not affect it. The use of this material has not only eliminated maintenance but also has eliminated renewals.

The tile used on the slope of the market pockets are 9x12x2-in. flat sections of solid vitrified glazed tile, smooth on top and wire-cut on the bottom. This is used for a permanent finish on concrete pockets. It has eliminated the continual renewal of hardwood bottoms. It also makes the pocket self-cleaning and eliminates the accumulation of fines—to slide out into the market car.



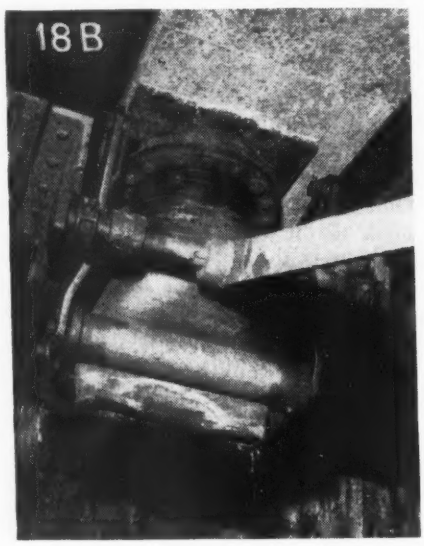


Fig. 18—New-type storage pocket for breakers with 16-in. pinch valve used as loading gate.

Conclusion

Gradually The Hudson Coal Co. has extended the use of rubber pinch valves throughout its breakers. Present plans are to eliminate all metal valves. While the first cost may be greater, the extended life and lowered maintenance requirements offset it. Rubber pipe resists abrasion of sand and corrosion of mine water, and can be used as throttle or shutoff valves.

Pinch valves, like rubber pipe, are limited to a temperature of 180 deg. and pressures of 100 lb. for the smaller sizes and 50 lb. for the larger sizes. Possibly increased pressure may be possible in the larger sizes by increasing the plies.

Pinch valves cannot be used in suction lines. However, they can be used between the sand pump and the settling cone when the suction is by gravity flow from the bottom of the settling cone to the pump. The admission of water through a water line connected to the foot elbow or tee starts the sand flowing.

As this is written, the rubber industry is in transition from crude to synthetic rubber, but it is expected that eventually synthetic rubber will be equal to or better than the best of crude rubber, and the change is not affecting the use of synthetic rubber products for the same services as crude has been used for heretofore. In fact, the synthetic will broaden the field, as it can be used with fluids and gases that have been rubber solvents.

The use of special equipment is a big subject and covers a multitude of items. Only a few, which have led to large savings, are mentioned in this paper. The subject should be studied thoroughly and a complete list of all materials should be compiled, so that the industry can profit by the experience of others.

Acknowledgments

The author desires to express his appreciation for the assistance furnished by J. F. McLaughlin, assistant superintendent preparation, The Hudson Coal Co., Scranton, Pa., in assembling this paper, and for photographs of equipment taken by K. W. Dolph, engineer, The Hudson Coal Co.

TIMBERING
For Safety in Mechanical Mining

Characteristics and Limitations of Single Posts and Crossbars—Why and How of Safety Posts—Late Systems of Protection Against Drawslate and Other Bad Top, Including Forepoling Possibilities

Coal Age
CONTRIBUTION TO
SAFER MINING

TIMBERING in coal mining has two main purposes. First, it keeps the working places necessary for extraction of the coal open either temporarily or permanently, depending upon the type of the openings and, consequently, their expected life. Second, it protects men and equipment against falls which would result in damage, loss or personal injury.

Normally, it is not the job of timbering to support all the overlying weight clear to the surface. The coal itself is expected to carry the major part of that burden until it finally is extracted. Timber, therefore, ordinarily has only the responsibility of supporting the strata immediately overlying the coal for as long as may be necessary.

The most common materials relied upon for support are the post and bar, whether of wood, steel or other metal. Alternates, generally finding application only in permanent or semi-permanent installations, include prefabricated steel sets, concrete, sand-cement coatings, concrete blocks, brick and masonry.

As in many other activities in coal mining, what happens at the face in timbering is by far the most critical. Falls are more numerous in the face zone, interference with the installation of timber and other roof support is greatest, the element of personal judgment is a larger factor and the choice of supports is more limited. All this is reflected in the fact that falls of roof and coal are the major causes of injuries and fatalities in coal mining, and in the further fact that such injuries and fatalities occur very largely in the face zone.

The problem of using the available supports, primarily the post and bar, for maximum results in holding roof and coal and preventing injuries might be tackled from several directions. One is an examination into what causes the greatest damage and the greatest number of injuries. The answer is that normally it is the thin layer of coal, slate or drawslate just over the seam or portion of the seam being extracted. Getting down a little finer, it is not entire sections of such top coal, slate or drawslate that normally give the trouble. Instead, it usually is a slab or chunk of rock or coal seldom running more than a few hundred pounds

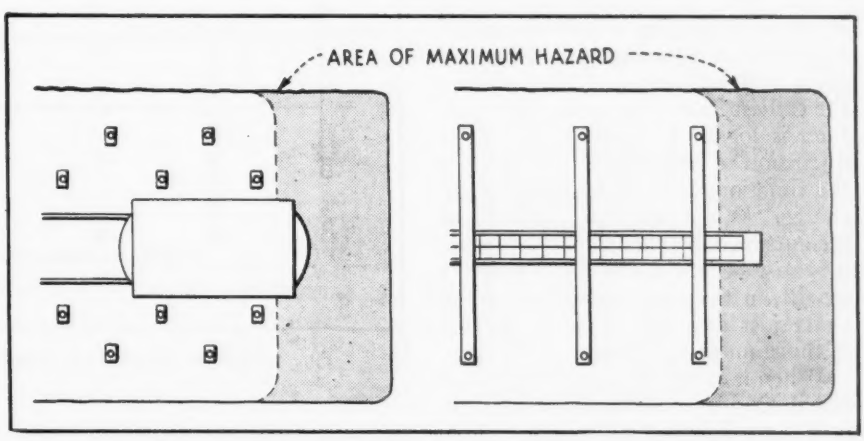


Fig. 1—Simple timbering plans with posts and bars showing how failure to advance timber or use safety posts leaves loader without protection in zone of greatest hazard.

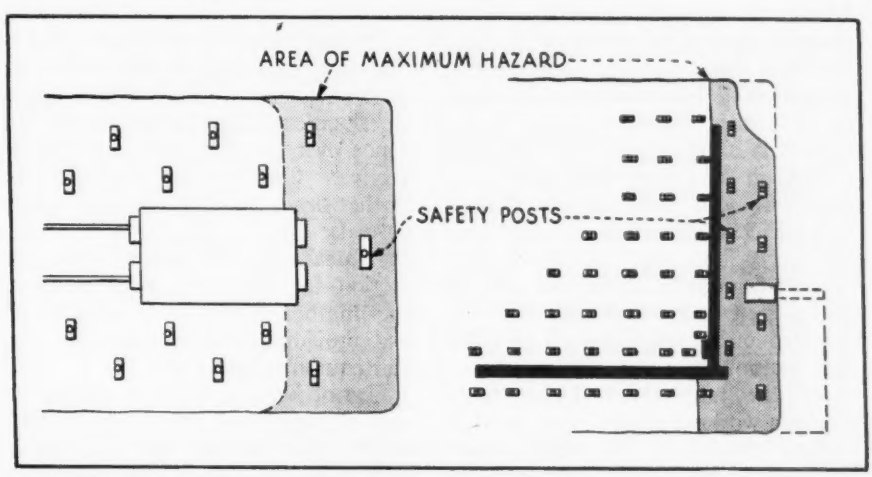


Fig. 2—Safety posts provide additional protection for men working in the face zone.

in weight and quite often rather small, relatively, in physical dimensions.

It is logical, therefore, to fix on casual chunks or slabs of coal or roof material as the major offenders and the major problems in arriving at a safe, efficient timbering system for use at the face.

The Job for Support

The job for roof support at the face, consequently, boils down to two things in most cases: (1) holding the weight of the stratum immediately over the coal, which may involve supporting up to, say, 10 to 15 ft. of material unless it is strong enough to support itself—the exception rather than the rule; and (2) preventing casual chunks or slabs of material that cannot be taken down in advance from falling out to damage equipment or injure men. Preventing falls of face and ribs offers substantially the same problem, although the emphasis largely is on preventing material from dropping off before it can be taken off deliberately, rather than a matter of keeping it in place.

The post, first of wood, now also of metal with jacking screws or special facilities for extending it, locking it in place and recovering it, was perhaps the earliest form of support. It, therefore, is logical to select it first for a discussion of how well it takes care of the functions it is called upon to discharge. When properly installed and accompanied by the proper cap piece it is an excellent device for supporting weight, in this case the weight of the strata just over the seam or portion of the seam being mined.

When it comes to protection against casual chunks or slabs, however, the post has definite limitations. Few mine roofs are sufficiently homogeneous, even if shooting and other activities were not a factor, to be free or nearly free of such casual material. Manifestly, if such material is to be guarded against to the limit, it must be taken down or each piece must be supported so that it cannot come loose, or if it does come loose, so that it cannot fall out of control. Often, it is difficult to detect such pieces and timbering with posts normally is done by putting in a number with the hope that every loose piece will have some support from at least one post. Manifestly, there is no assurance that undetected pieces large enough to kill a man cannot drop out between posts, unless they are set so thickly as to preclude working in the place, or that a piece caught on the edge cannot break off or swing down and kick out the props. Single posts, therefore, have their limitations, although where properly used they materially reduce the hazard.

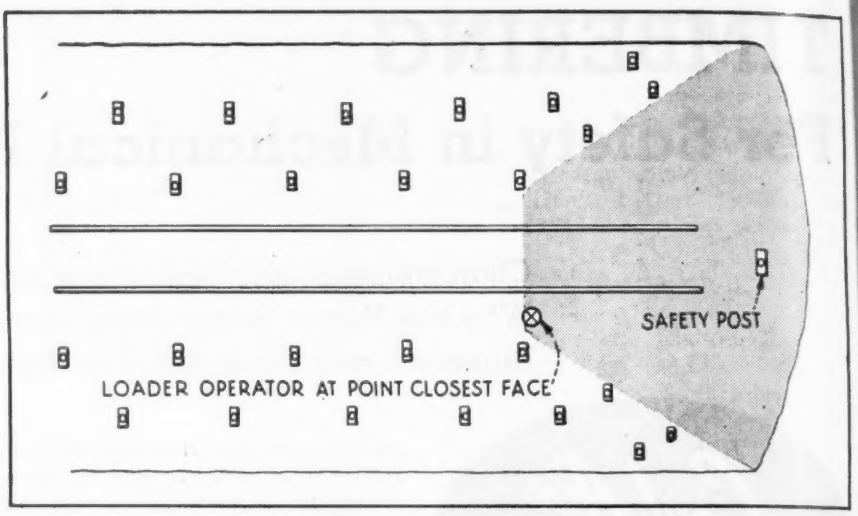


Fig. 3—Funnel system for mechanical loading provides maximum protection within limitations of posts to most of the men in the face zone while leaving the face area free for the loading operation. Safety post is an added safeguard for men at the face.

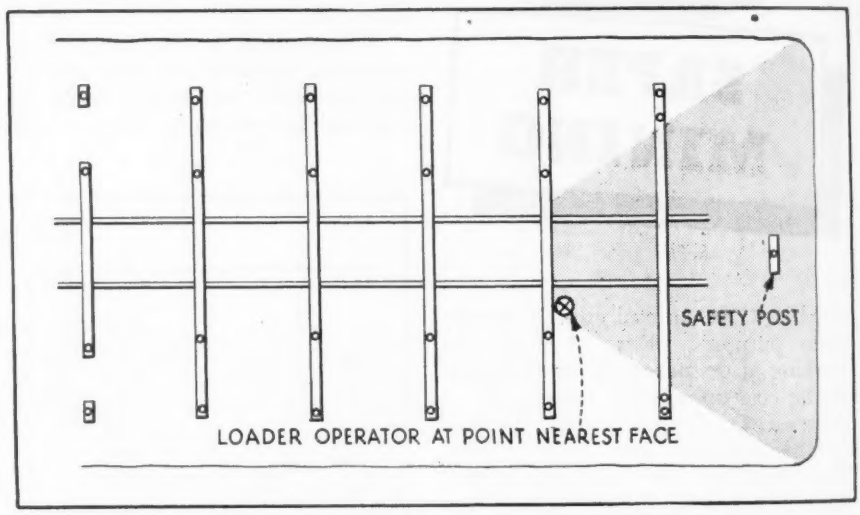


Fig. 4—Funnel system with crossbars plus safety post in loading zone.

Cap Pieces Help

In view of the small area covered by the post, thus limiting the area it can protect, long cap pieces were a logical development, thus increasing the distance over which a post might be effective. Carrying the principle still farther leads to the crossbar, which extends over a substantially greater roof area and thus increases the protection—at the same time reducing the number of posts that must be set and providing a freer space for men and equipment to work.

Use of bars, however, is subject to certain limitations, one being working height and another the practicable span they can cover. In thin coal the thickness of the bar may mean the difference between using or not using a loading machine. However, even thin planks, if of good quality and requisite width, can support a surprising load and have been the answer in a number of cases where height has been the critical factor.

Crossbars, no less than posts, also are subject to some of the same limitations, although perhaps not quite to the same degree. Unless they are installed very close together, it is possible for pieces to fall out between them or to fall on them and slide off even if they do not twist or kick the bars out entirely. Anent the latter, the wider bar, within practical limits, because of increased bearing area, is less subject to being displaced by twisting or kicking action. It is, of course, evident that where it can be used the bar provides more protection than the post or post and cap piece.

Plans for installing timber of the

post, post and cap or post and bar types are of necessity influenced by the mining plan and mining equipment employed. Where hand loading into cars or onto conveyors laid up the center of the place is the practice, conventional plans enable them to provide the maximum protection that their nature permits. Fig. 1 shows how timbering often is done at the face with posts and bars, although there are many variations in detail.

Examination of Fig. 1 makes it evident that while the maximum protection the post or post and bar can afford is in effect over much of the length of the place, they offer, when set as shown, little or no protection in the working zone, which also is the zone of the greatest hazard. The remedy, of course, is to extend the timbering as the coal is loaded, but this is a little more difficult than it sounds, especially when bars are employed. Consequently, the safety post is most often chosen to carry the burden in the actual working zone whenever loading, cutting, drilling, shooting or other activities are being carried on. Despite its limitations, experience has proved it to be a real life saver, although this does not preclude the possibility of even better methods of protection.

Some methods (there are many) of employing the safety post, or posts, are shown in Fig. 2. While no hard and fast distances have been laid down, practice seems to indicate that with fair to good roof any man working in the face zone ordinarily should not be more than 5 to 6 ft. away from a safety post at all times, while with

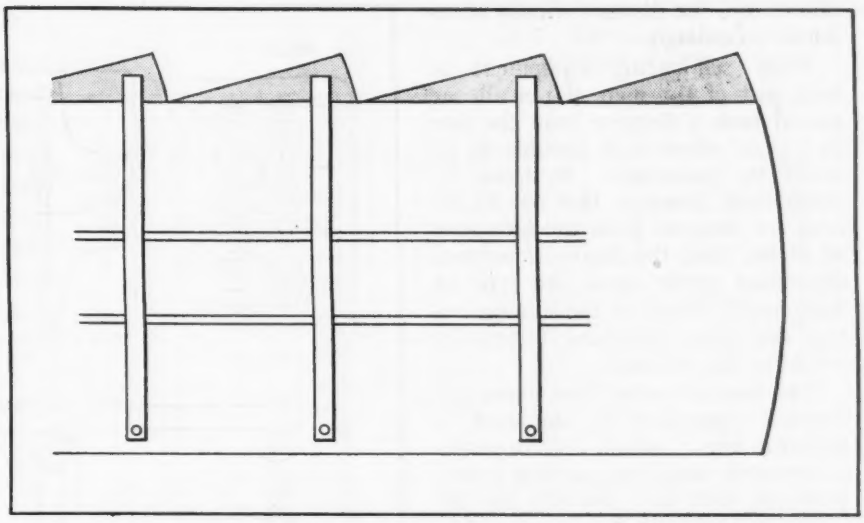


Fig. 5—Slotting one side of place with topcutter as a support for crossbars in narrow work

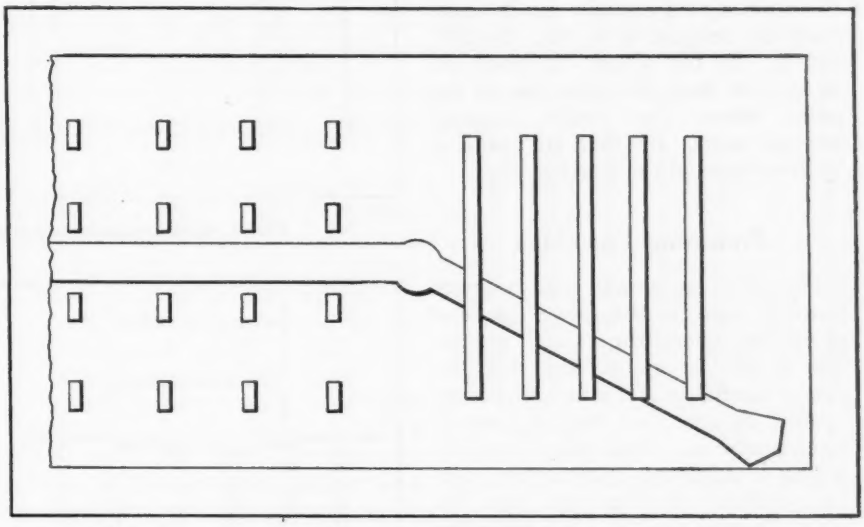


Fig. 6—Timbering with self-loading conveyors, using crossbars in the center at the face and posts behind the swivel.

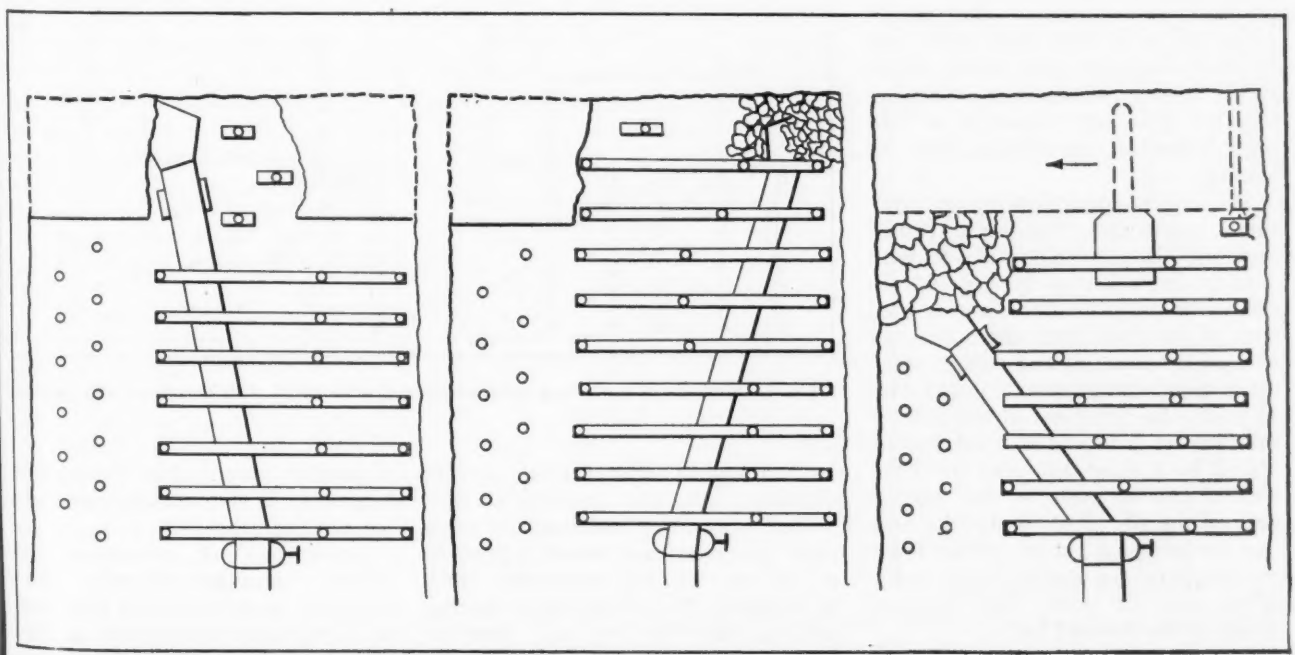


Fig. 7—Timbering under drawslate using crossbars on the sumping side and jacks on the finishing side of the place.

poorer top, the distance should be reduced accordingly.

With self-loading equipment at least part of the men, if not all, are moved back a distance from the face to a point where it is possible to increase the protection. It should be emphasized, however, that not all the men are removed from the face zone all of the time, the degree of removal depending partly upon the type of equipment, as well as the mining system and other pertinent factors involved in the problem.

How men are pulled back when mechanical equipment is employed is shown in Fig. 3, which also illustrates a commonly employed posting system providing maximum freedom for the loader to work with maximum protection of most of the crew. The way the posts are set logically results in its common designation as the "funnel" system. In this system the posts are set to the track-clearance line to the point where the loader operator normally works, and then are funneled to the corners of the working place.

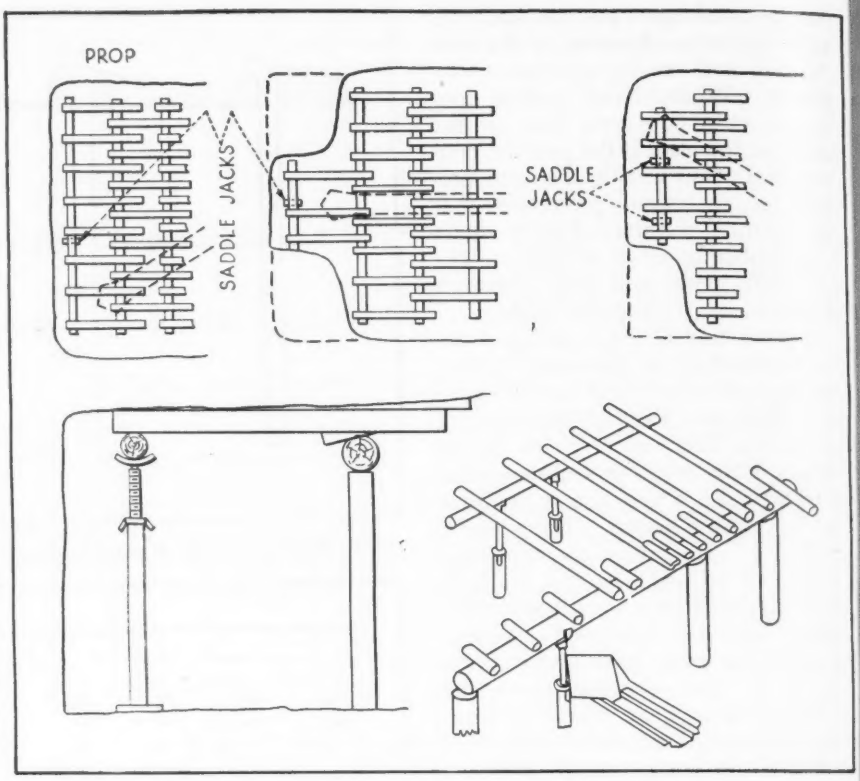


Fig. 8—Double-planking method of "floating" drawslate or stone.

Protecting Face Men

Operator, motorman and snapper normally work in the area of greatest protection under the funnel system, but it will be appreciated that the case of the helper and others who must venture into the face zone at times is less propitious. Also, unless the timbering is advanced immediately, cutters, drillers, shotfirers and the like normally must work in a less protected area. Consequently, it is the custom in many places to keep at least one safety post out in front of the loading position. Even where the timbering is advanced before face preparation, one or more temporary posts often are set in the funnel and along the face during this cycle and frequently at least part, if not all, are left in place for loading.

Where roof conditions warrant additional protection, the same funnel principle also may be employed with crossbar as indicated in Fig. 4. In this particular plan short bars are used back of the face zone where the roof is freshly exposed and where men must spend more time. As the face advances, the long bar at the rear of the face set is moved forward and replaced by a short bar over the track with a row of posts in the interval next to the rib. Posts under the long bars are funneled out to provide room for swinging the loading head and a safety post, or posts, may be used ahead of the forward bar.

In narrow work legs normally are set against the rib and the track may be laid slightly off center to provide clearance on the operator's side. Where top-cutting machines are used, some operators have found it possible to slot one rib, and sometimes both, by swinging the bar out when starting and finishing the top cut. One or both legs are eliminated and normally the process of installing the bar is somewhat faster. Fig. 5 shows bars supported in slots on one side and on legs on the other.

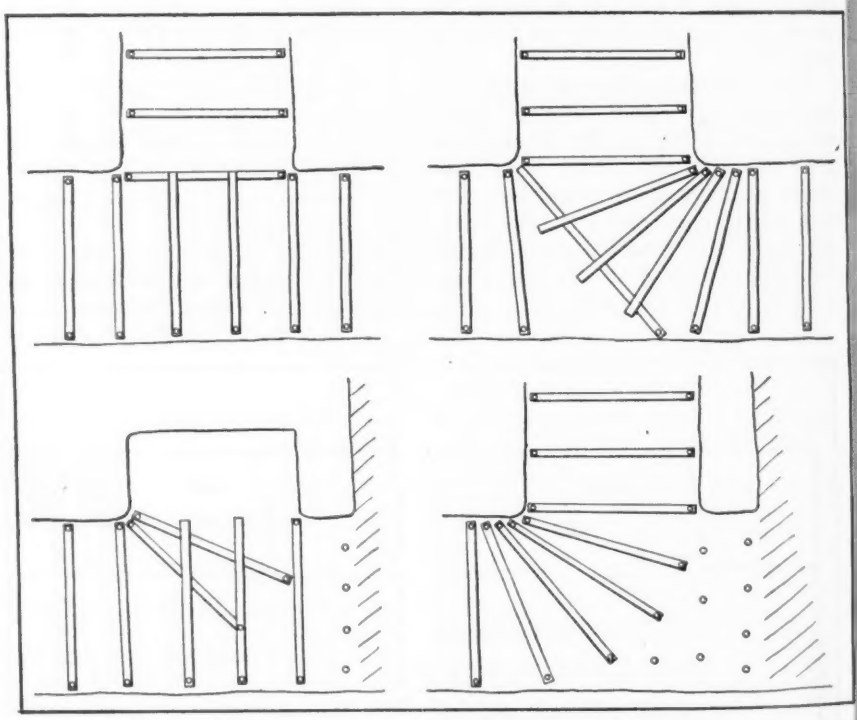


Fig. 9—Methods of protecting room necks and other turns with crossbars and headers

Application of conveyors under "stone," drawslate or other roof of less than favorable nature has resulted in development of a number of timbering plans designed to combine protection with minimum interference in

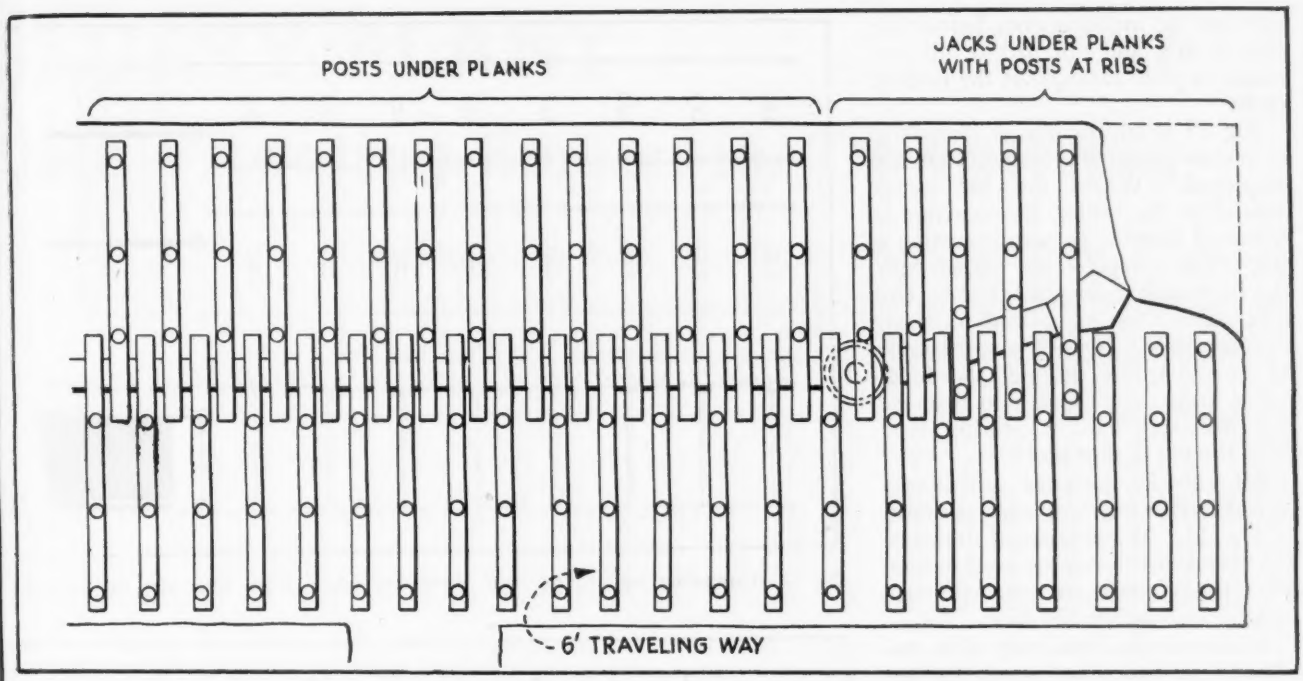


Fig. 10—Forepoling with crossbars, lagging and saddle jacks under bad top.

loading and other face operations. Part of the reduction in interference is accomplished by liberal use of roof jacks. In this connection it has been found that in many cases bolting the wood cap piece to the jack head materially reduces time for wedging and capping where it must be done and, of course, increases the bearing area and protection afforded by the jack.

One combination of bars at the face and posts behind the swivel is shown in Fig. 6. Additional posts or jacks, which are moved as necessary, may be set in addition to the bars. Variations include long bars all the way or short bars over the pan line behind the swivel.

Where "stone" or drawslate must be "floated," a common practice is to carry temporary bars at the right of the place where equipment normally is parked, sumped, etc. There are many variations, but normally the bars are supplemented by roof jacks moved as necessary, and jacks or posts are employed exclusively at the left, or finishing-up corner, in which men are not required to spend as much time. Two stages in loading under such timbering system are shown in Fig. 7.

"Double planking" has been adopted at some operations with very bad drawslate which cost considerations dictate "floating." This system possesses the feature of permitting advancement of the roof support as fast as the coal is loaded, plus crossbar protection the entire width of the place. How it is done is shown in Fig. 8. Each bar is supported on three posts, with the overhang at the center protecting the conveyor. As soon as enough coal is loaded on the right side of the face, a plank is put up on jacks, followed by a second as soon as the back of the cut is reached. The same process is repeated in loading out the left side. When the pan line is lengthened and the swivel is moved up, jacks are replaced with posts.

Timbering at roomnecks and where other openings are turned offers added difficulties under most circumstances because of the necessity for providing for track curves and equipment movement. If height permits, however, crossbars can be employed in several fashions to give reasonably good support and protection. A number of plans are shown in Fig. 9. It will be noted that they either are based on fanning the bars or using bearing bars or headers in certain places.

The double planking system previously outlined has some of the attributes of what is known as forepoling. Incidentally, while forepoling has not been used to any great extent in coal mining, it has certain advantages, a major one being that it reduces the element of personal judgment. This is in line with the principle that as roof support gets closer to an automatic process, the more it is likely to achieve maximum results, assuming the plan itself is good. One method of forepoling under bad roof in a pitching seam is illustrated in Fig. 10.

Other forepoling methods may employ either slots or drillholes to accommodate rails, bars, pipes or other types of forepoles. One major advantage of forepoles, especially when used under drawslate, is that the sup-

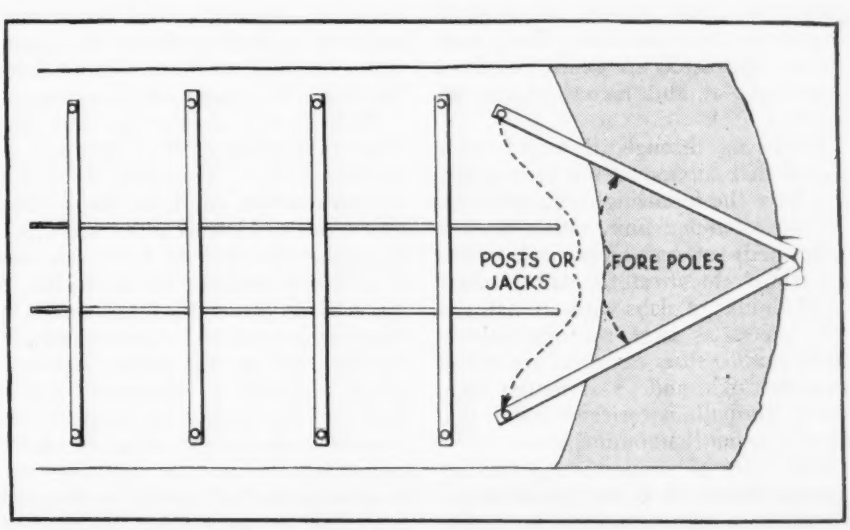


Fig. 11—Forepoling by slotting back of cut with topcutter in narrow work.

port can be installed even before the coal is shot and—in part or all—remains in place throughout the loading cycle.

Fig. 11 is an example of forepoling in narrow work where top-cutters are employed. Where the bar comes around to the center, the machine is trammed forward to permit cutting a slot. The forepoles are placed with the back ends resting in the slot. The outer ends then are placed on posts or screw jacks. Fig. 12 is an example of forepoling by drilling, the holes being made deep enough so that the forepoles still have a bearing even after the cut is shot down.

Substantially the same system may be followed in conveyor work, as shown in Fig. 13. When desired, drawslate may be taken down in the usual fashion when the forepoles are removed preparatory to advancing the face.

Whatever the timbering plan employed, experience has proved that system is a key factor. Operators who have made timbering yield the best results have (1) drawn up a standard plan, and (2) insisted that minimum requirements be met in each and every place with as much extra timber as conditions may warrant. There is no alternative for system in timbering since air is a poor substitute for a post or bar.

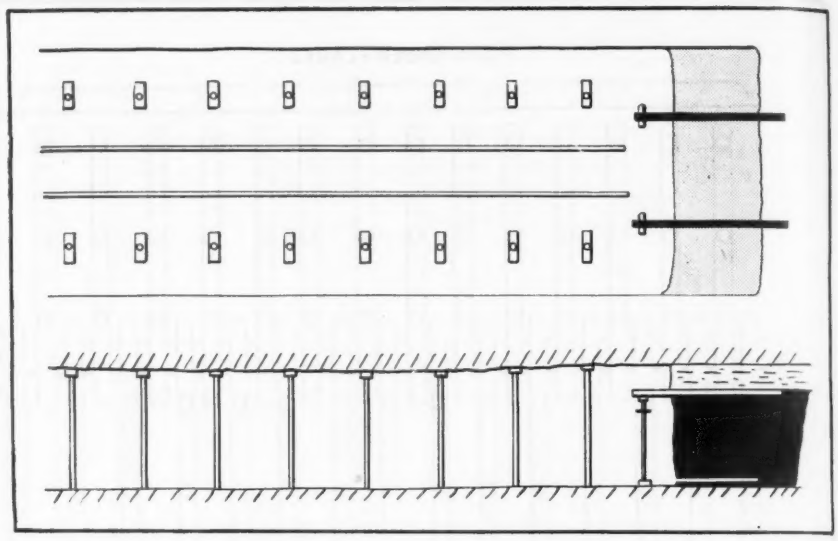


Fig. 12—Forepoling by drilling, with drawslate taken down after the cut is loaded.

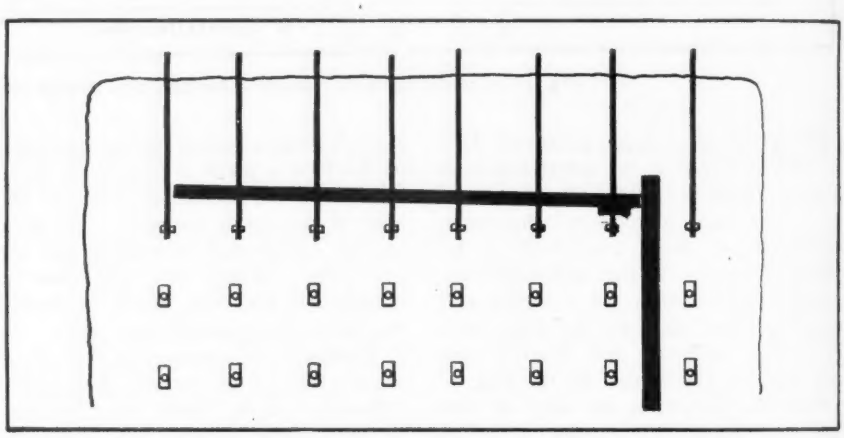


Fig. 13—Forepoling by drilling in conveyor mining.

What Support Must Do

In considering how protection at the face zone might be further improved, the problem might be restated. First, the critical factor is casual chunks or slabs of rock or coal. Second, the usual methods of timbering, by their very nature, leave openings, even though they may be relatively small, out of which such chunks or slabs can fall. Third, the conventional timbering plans normally involve a greater or lesser degree of personal judgment and initiative. Thus, they are not completely automatic and leave something at the mercy of human nature.

Following through, it would seem logical that support at the face might well have the following characteristics: (1) an all-in-one unit, rather than a multiplicity of bars, legs, jacks, etc.; (2) ability to arrest the fall of even small chunks of slabs with strength to hold pieces as large as those which posts, jacks or bars normally are called upon to catch; and (3) a design such that it normally is easier to install the support rather than omit it.

One type of support suggested as meeting many of these specifications would be a net supported by jacks. With a mesh of, say, 6 in., such a net would stop all but small pieces. The next question would be ability to hold any weight that normally would be encountered without having a support so cumbersome and heavy that it could not be handled and installed. Wire meshes now available or which might be made apparently meet these qualifications, including ability to support up to 2,000 lb. or more without being too heavy for convenient handling.

Perhaps nets of this type may have been tried, although there seems to be no record of it. Therefore, discussion of construction must be on a theoretical basis. However, the net might be approximately 6 to 8 ft. wide and of a length suitable to the width of the working place. Facilities would be necessary at each end to permit attaching the net to the screw jacks on which it would be supported, and it probably also would be necessary to provide turnbuckles or other means for tensioning the net to eliminate sag. In moving the net would be dropped and rolled up so it could be handled by, say, two men.

In addition to the jacks at the corners on each side of the place, the net could be supplemented by jacks or posts put up to the top against the meshes, or a few jacks with long cap pieces might be employed for the double purpose of limiting sag and providing additional roof support.

Disadvantages include sag, which would interfere, where headroom is limited, with passage of large lumps over loading machines; possible higher first cost as compared to cost of conventional supports; and susceptibility of the small wires to corrosion, local breakage, fatigue and the like, in addition to weight and difficulty in handling.

Perhaps the net, or some other new support, may not be the best answer or even a better answer than present methods. In view of the number and cost of fatalities resulting from roof falls, however, investigation of the problem of a better method of support certainly warrants greater investment of time and money to explore the problem further.

SLURRY PLANT

Uses Vibrating Screen for Dewatering

Slurry-Recovery Plant for Minus 10-Mesh Coal Adds to Tonnage Available for War Needs—Research Results in Improved Dewatering of the Cleaned Product on Vibrating-Screen Equipment

PRESENT-DAY NEEDS for every possible pound of coal have stimulated interest in methods of increasing recovery as well as in finding new sources. One source of additional tonnage largely neglected in the past is fine coal, or slurry, in the wash water. Among the operations where steps have been taken to recover this material is the Red Ember plant of the Truax-Traer Coal Co., Fiatt, Ill. After considerable research this company has improved the dewatering of the fine material, after cleaning, on equipment of the vibrating type.

The Red Ember operation also illustrates graphically the changes which development of modern mechanical equipment has wrought in coal-preparation methods. The original plant was an all-steel five-track Morrow tipple. In 1938, the plant was supplemented with a McNally-Norton washing plant (one washer for 6x2- and a second for 2x0-in. coal) and two more loading tracks were added. A McNally-Vissac thermal drying plant for minus ¾-in. washed coal went into service in October, 1938 (October, 1939, *Coal Age*, p. 49).

Slurry Plant Built

Decision to recover, clean and dry fine coal previously pumped to waste resulted in placement of an order late in 1943 for a McNally-Rheo sludge-recovery, cleaning and drying addition with a capacity of 75 tons of minus 10-mesh, or approximately ⅛-in., coal per hour. Provision was made for dewatering on special vibrating equipment and after such dewatering for returning the recovered material to dewatered washed screenings for final thermal drying in a new McNally-Vissac unit added to the existing drying plant.

The feed to the fine-coal plant originates in the sludge tank for the main plant from which the ⅛x0 is removed by a scraper conveyor to a sump. This sump also receives regulating material and overflow from the washer feed cone and acts as a classifier in removing approximately 60-mesh material. From the sump the fine coal is pumped to the feed cone, from which it is fed through a regulating valve to a scalping screen. This screen takes out the plus $\frac{3}{16}$-in., which is returned to the regular coal circuit. This plus $\frac{3}{16}$-in. fraction represents spillage and leakage throughout the washing plant, which otherwise would be lost.

Minus $\frac{3}{16}$-in. material through the scalping screen goes to the McNally-Rheo washer. The final clean product represents a recovery of from 75 to 80 percent with an ash content equal to the larger sizes. This clean fraction is derived primarily from the top launder, although provision is made for skimming off part of the product of the second launder for incorporation in the clean product.

In setting up the slurry plant it was decided to see if the necessary dewatering could be done with vibrating equipment. Consequently, a 4x16-ft. Robins "Eliptex" screen was purchased to receive the cleaned coal from the launders and reduce the moisture content. It was equipped with a special cloth with ½-mm. openings. When this screen first went into operation, it removed a large percentage of the surface moisture from the ⅛-in. cleaned coal. The result, however, was below desired figures. Hence, a manufacturer's service man was called in and work was begun to see how the screen could be made to do a better job.

By trial and error several alterations and additions finally were evolved. First, the inclination of the screen was reversed. Instead of the material working downhill to the discharge, in accordance with conventional practice, the screen angle was changed to make it proceed uphill, retarding the progress of the water that much more through gravitational pull. This also increased the time the coal remained on the screen and likewise the time in which the water could drain, in addition to overcoming the tendency of the water to surge forward.

The customary arch next was removed from the cloth so that the coal and water would not run to the sides. Thereby the entire cloth area is utilized for dewatering. Finally, two major changes were introduced to complete the job. These changes resulted in a performance exceeding original expectations.

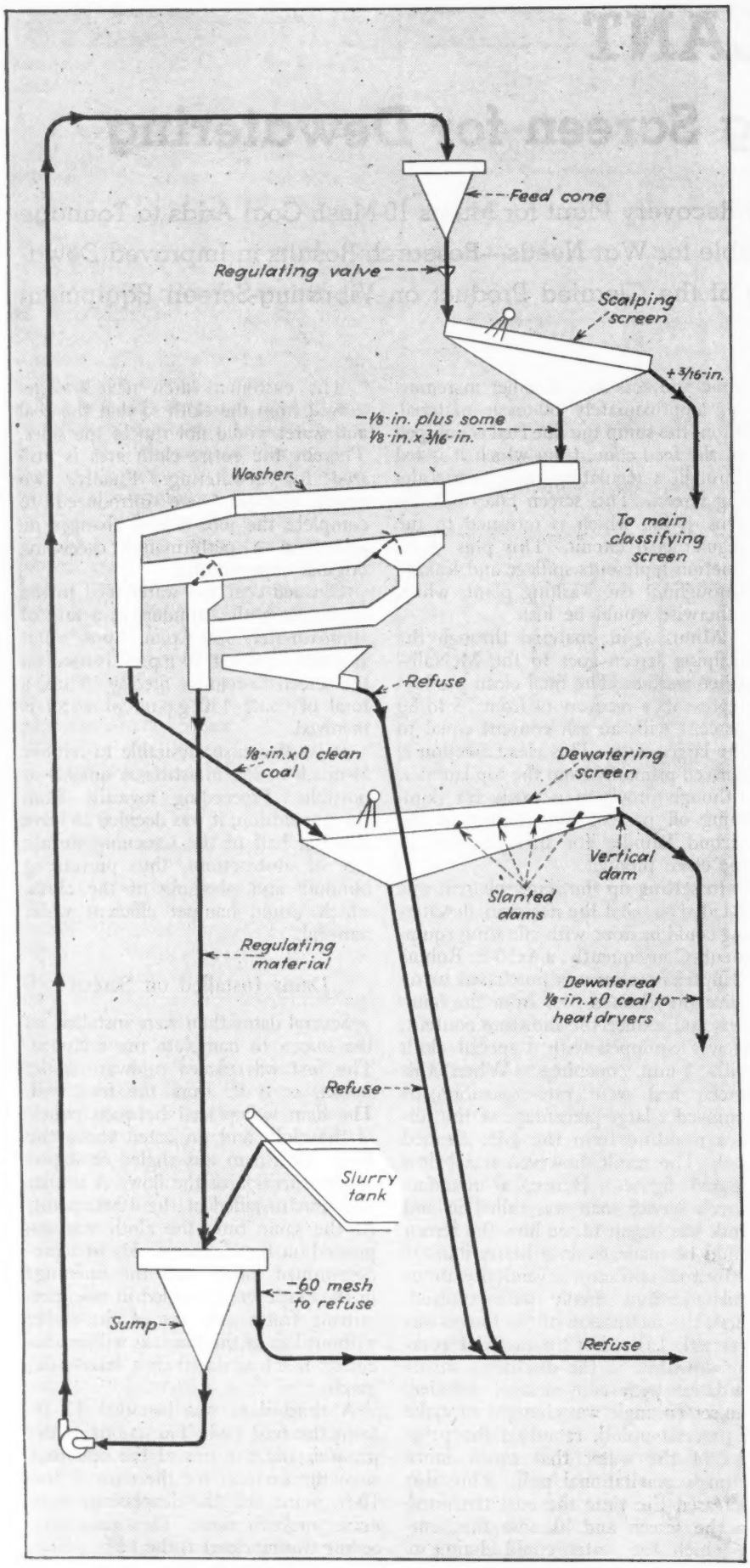
Cleaned coal and water feed to the screen from the launders at a rate of approximately 350 g.p.m. Spray water at a rate of about 80 g.p.m. is used on the screen to remove fireclay. Thus, a total of some 430 g.p.m. of water is involved.

It is, of course, desirable to remove as much of the moisture as quickly as possible. Proceeding logically from this conclusion, it was decided to leave the first half of the screening surface free of obstructions, thus preventing blinding and plugging of the cloth, which would hamper efficient water removal.

Dams Installed on Screen

Several dams then were installed on the screen to complete the revisions. The first was placed midway of the screen, or 8 ft. from the feed end. The dam was placed between panels of the cloth and projected above the deck. This dam was angled or sloped in the direction of the flow. A similar dam was installed at the 10-ft. point. At the same time the cloth was depressed on the discharge side in a predetermined radius and the openings in the cloth were doubled in size, permitting faster drainage of the water without loss of the fines, as will be discussed in more detail in a later paragraph.

A third dam was installed 12 ft. from the feed end. The radius of depression and the size of the openings were the same as for the dam at the 10-ft. point, but the depressions were made on both sides. This same procedure was repeated at the 14-ft. point. Then, at the 16-ft. point, or discharge end of the screen, a *vertical* dam was



How the Red Ember slurry-recovery and dewatering plant operates.

installed and was accompanied by depressed cloth and increased openings on the feed side.

Choice of dam locations, depth of depressions and size of openings, when final adjustments were made, were found to provide a perfect balance for drainage—a balance made necessary by the tendency of the fine coal to coagulate into masses exceeding the size of the openings.

The dams were installed to introduce obstructions against which the coal can back up to create a bed in which the finest size can cohere. The backed-up mass also tends to result in squeezing of the water out of the bottom layer, accelerating the dewatering operation.

The cloth was depressed to impart a rolling motion to the coal, causing it to coagulate and firmly entrap even the finest particles within the mass so that they cannot pass through the screen cloth with the water.

Sloping Prevents Remixing

The dams were inclined, or sloped, in the direction of flow, to prevent remixture of coal and water. If they had been vertical, the bottom layer of water adhering to the dam would travel up, over and down, remixing with the coal on the discharge side. Sloping results in the water returning at a backward angle (because of capillary cling) while the coal, which has been agitated in the depression, rolls forward, going over the dam, accelerating the process of separation from the water.

The increased size of openings in the depressions naturally were to provide freer escape for the bottom layer of water.

These alterations and revisions were completed Dec. 14, 1944. With the Robins "Eliptex" screen handling the ¼x0-in. cleaned coal at a rate of 25 to 60 tons per hour, it was found that a high percentage of the surface moisture was being removed with no appreciable loss of the fines. This performance has remained constant ever since, according to Truax-Traer operating officials.

MINE FIRE FOUGHT

With Dry Ice, Bulldozers and Rock Dust

Outcrop Fire at Greenhill Mine Posed More Than Usual Problems in Suppression—Fought by Clay Mat Spread on Surface by Bulldozers, Cooling With Dry Ice and Rock Dust and Clay Flushing

By J. H. BRUSSET
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MANY NEW METHODS of fire-fighting were applied by the West Canadian Collieries, Ltd., when a fire occurred at the Greenhill mine, Blairmore, Alta., Canada. Among these were: Using bulldozers to cover the coal and rock with a continuous bed of clay so deep that no roof falls resulting from the fire would crevice this covering; (2) use of dry ice to cool coal, roof and floor, and so make it possible to explore and work in the area within seals; (3) blowing rock dust into the fire area through drill-holes, using for that purpose inert gas drawn from that area, thus reducing temperatures and coating coal with incombustible material, and (4) flushing of roadways to increase tightness of seals.

On Oct. 25, 1943, a party of fire-bosses, in making their regular weekly inspection of airways, discovered smoke escaping from the Greenhill mine. Probably the fire at that time already had been smoldering several days, but as it started at the top of an old dirt-filled raise where the coal bed approached the surface, only a small quantity of smoke could filter through, and the plume of mist that, in the autumn, usually crowns the fan probably prevented the fanman from noticing the smoke. The level heading from this raise to the fan (the fanway) is 200 ft. long and starts at a point in the raise 70 ft. from the outcrop.

It seemed impossible to ascertain how the fire originated because apparently, as stated, it was not discovered until a long time after it started, but possibly a careless smoker threw a match into the opening at the outcrop, and thereupon the old dried timber lining the raise caught fire.

The Greenhill mine workings proper are located in the No. 1, or upper, seam, a bituminous bed 12 ft. thick overlain by a strong bed of conglomerate. Of the Greenhill mine itself, little is to be seen in Fig. 1, and that little has been sketched in broken lines, nor are any of its workings shown in Fig. 3, because in neither case did the fire extend to the workings in the upper seam.

The airways leading from the outcrop in the Cougar valley are not in the same bed as are the workings of the Greenhill mine but are in the lower, or No. 2, seam perpendicularly 45 ft. below the upper, or No. 1, bed. This bed is 18 to 25 ft. thick and surmounted by shales and sandstones. In that immediate vicinity, No. 1 seam was mined out about ten years ago, and the strata between the beds, both of which dip at 43 deg., undoubtedly are so fissured as to permit of the passage of gases from the lower to the upper bed.

Workings in the lower seam in that district comprise:

1. Two airways, driven specifically to serve as returns from the workings in Levels 6 and 7 of the upper bed. These airways, not being on the full pitch, are inclined at an angle of only 33 deg. to the horizontal. They are 1,800 ft. long and are supported by steel arches 12 ft. high each with a span of 14 ft. They are lagged partly with poles and slabs but partly also with ⅜-in. square steel rods, tightly hooked to the sets.

2. The Cougar North mine, the main entrance to which is 80 ft. above the burning airways. (The burning raise and its companion raise and the cross heading are separated by only a 40-ft. pillar from the water level of that mine.)

3. Airways at intermediate level No. 5. (These are connected by a rock tunnel to the old workings in the upper bed, and were driven to keep those workings free from accumulations of methane.)

Efforts made to suppress this fire may be divided into three stages.

A. Direct Fire Fighting
Oct. 25-Nov. 3, 1943

At first, as the top of the raise, where the coal bed outcropped, was the only area affected by the fire, it

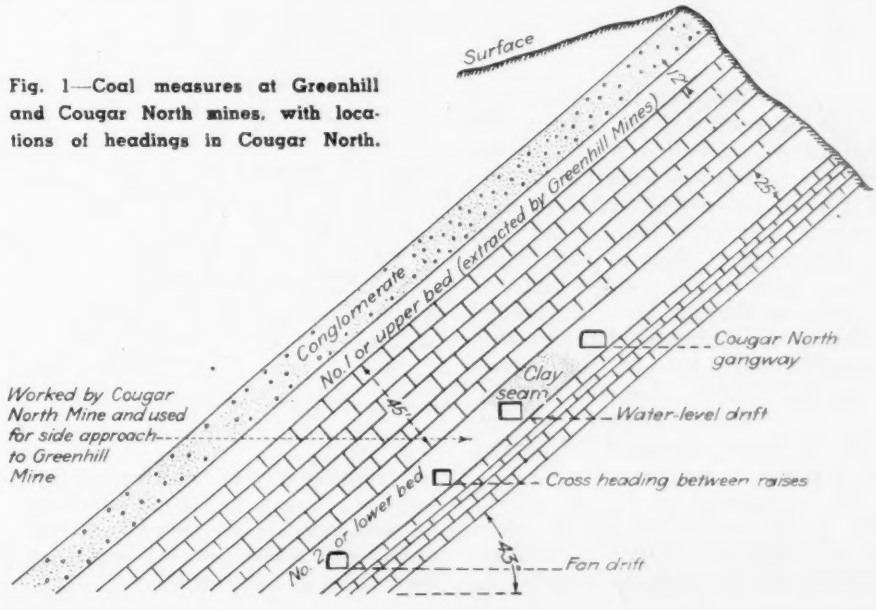

Fig. 1—Coal measures at Greenhill and Cougar North mines, with locations of headings in Cougar North.

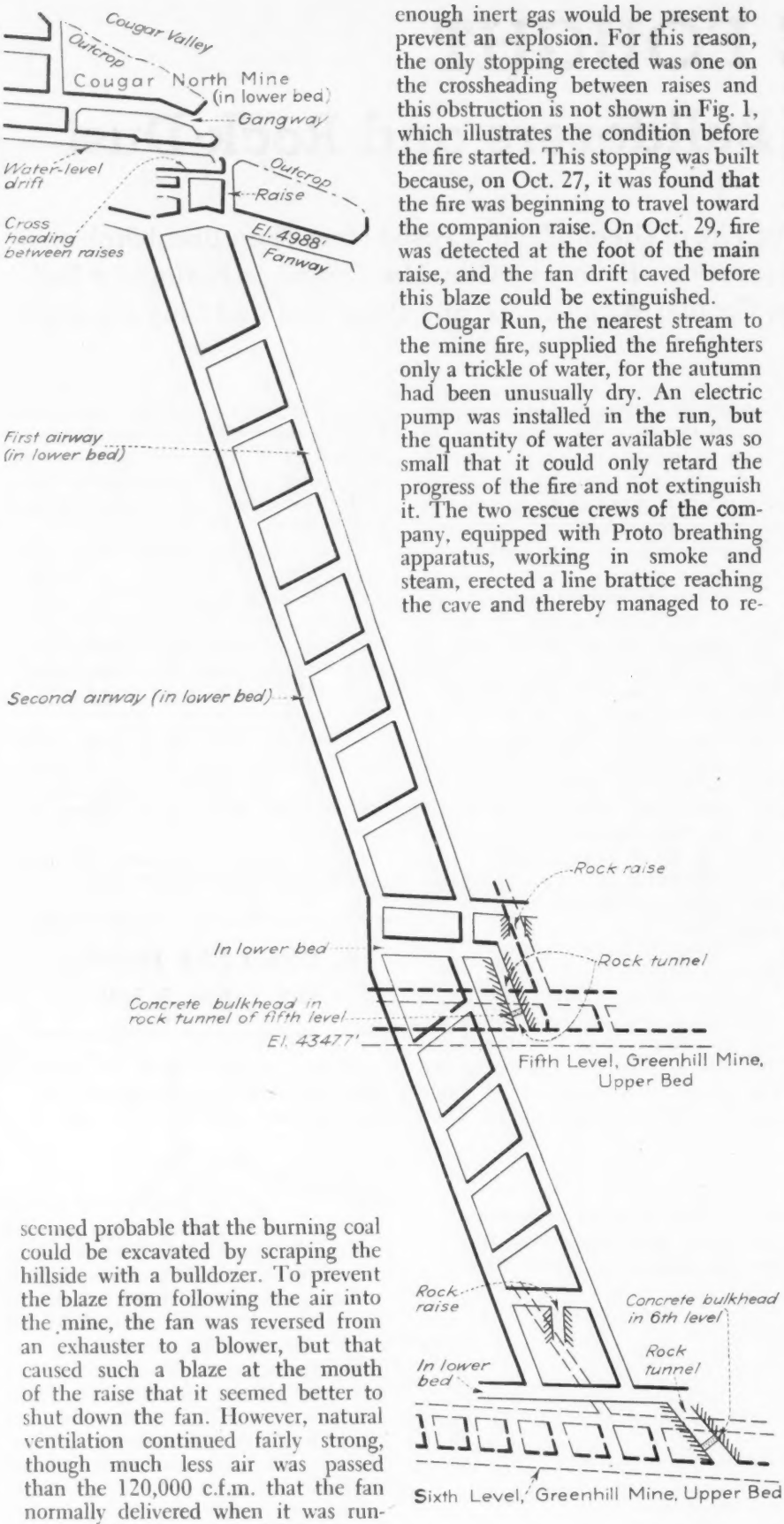

Fig. 2—General plan, showing the airways at an angle to the full pitch from the Sixth Level to the surface; also connecting rock tunnels between upper and lower beds as before fire.

seemed probable that the burning coal could be excavated by scraping the hillside with a bulldozer. To prevent the blaze from following the air into the mine, the fan was reversed from an exhauster to a blower, but that caused such a blaze at the mouth of the raise that it seemed better to shut down the fan. However, natural ventilation continued fairly strong, though much less air was passed than the 120,000 c.f.m. that the fan normally delivered when it was running, so the air contained 2.5 percent of methane.

In consequence, it was concluded that if the airways should be closed by stoppings, the methane percentage would reach the explosive limit before enough inert gas would be present to prevent an explosion. For this reason, the only stopping erected was one on the crossheading between raises and this obstruction is not shown in Fig. 1, which illustrates the condition before the fire started. This stopping was built because, on Oct. 27, it was found that the fire was beginning to travel toward the companion raise. On Oct. 29, fire was detected at the foot of the main raise, and the fan drift caved before this blaze could be extinguished.

Cougar Run, the nearest stream to the mine fire, supplied the firefighters only a trickle of water, for the autumn had been unusually dry. An electric pump was installed in the run, but the quantity of water available was so small that it could only retard the progress of the fire and not extinguish it. The two rescue crews of the company, equipped with Proto breathing apparatus, working in smoke and steam, erected a line brattice reaching the cave and thereby managed to re-establish a passage on Nov. 1 to the first airway (see Fig. 3), but the fire kept traveling along the top of the fan drift, using the lagging and the carbonaceous shales in the roof as fuel, and a very large body of rock fell in the evening of the same day, blocking the passage completely. In the morning of Nov. 2, an exploratory party traveling up the long inclined airways found the fire quite close to the second airway.

It was decided, in accord with the general practice which favors sealing the intake first, to attempt to erect stoppings **A** and **B** in the two airways so that no fresh air could reach the blaze. The air in these passages was return air with regard to the Greenhill mine, but intake air as regards the fire. This air had already a high percentage of methane (2.5 percent), so it was recognized that closing it off would be a dangerous operation. In consequence, all men, except two crews of workers under their pit bosses, were withdrawn from the mine.

Two difficulties, however, prevented the plan from being successfully prosecuted:

1. The natural ventilation increased tremendously as the fire traveled down the steep airways, and its rate of progress increased correspondingly.

2. The work was painfully slow because the road to be traveled and over which the materials had to be carried was long and steep. Only light material such as boards, brattice cloth and sheet iron could be used under such strenuous conditions and accordingly the stoppings could not be made tight enough to smother the fire.

Three dangers now presented themselves: (1) that, through cracks in the 45 ft. of intervening strata, the fire might reach into the goafs of No. 1 seam which were above the two airways which the fire had invaded; (2) that it might extend down the airways until it reached the rock tunnel connecting the fifth level of the Greenhill mine with No. 2 seam; or (3) that it might travel even into the live workings of the sixth level through a corresponding rock tunnel from the airways. In all three eventualities, the Greenhill mine with its 2,500-ton daily output would have been placed in grave danger, if not totally lost.

B. Checking the Fire

Nov. 3-Nov. 15, 1943

On Nov. 3, it was realized that a radical solution was necessary and, as

crews could not place a tight seal in the airways, it was decided that the ventilation should be obstructed on the outside of the mine. In view of the danger of an explosion, all men were withdrawn from the workings, and the two bulldozers of the company were set to scrape and push all the surface material into the cave holes and into the old raise. This work was continued through the night, and by the next morning the openings had been fairly well sealed with only a few wisps of smoke showing here and there along the outcrop. It was generally agreed that if there was to be an explosion it might occur at any time within the first few days, so that it would be unsafe to enter the mine before Nov. 6.

Meantime, a stopping was prepared outside the mine of ¼-in. steel plates bolted together to fit the steel arches which support the roof in the rock tunnel leading to the sixth level. The several parts of this stopping were so arranged that they could be quickly assembled.

At the same time, several other important measures were undertaken outside the mine to extinguish the fire and to check its advance toward both the old mine and the new.

1. *Making the Fire Seal on the Outside Tighter, Larger and More Permanent*—This was done by adding three more bulldozers leased from local contractors to the two already owned by the company. A pit was opened in the vicinity, and a large volume of clay spread over the outcrop. In a few days, that clay blanket had become 200 ft. long and 50 ft. wide with an average depth of 15 ft. By its massive proportions, it stopped all small leaks through the fissured rocks along the outcrop and, because of its thickness, it was capable of filling and thus plugging automatically any new cave that might develop from the burning of the coal. This was imperative because safety depended on keeping the outcrop permanently sealed. A momentary reopening would have caused explosive gas to travel over the fire and an explosion would have occurred.

2. *Protection for the Cougar North Mine*—It was always possible that the thin 40-ft. coal pillar down the slope from the Cougar North mine might cave and, as the coal was over 25 ft. thick at this point, the openings to the surface would be large and let in much air. As protection, the outcrop was scraped down with bulldozers to a depth of about 20 ft., which brought it to the level of the rails of the water level (see Fig. 3). This excavation was then filled with clay.

3. *Drilling of Boreholes*—Five boreholes were drilled from the surface to strategic points in the airways with a cable drill lent by the Sullivan mine of the Consolidated Mining & Smelting Co. This drill arrived at Blairmore Nov. 7 with its operative and was immediately put to work. A rotary drill also was obtained from Calgary.

4. *Pumps and Pipelines*—A 6-in. pipe 5,000 ft. long was laid Nov. 10 from Blairmore Creek at a point 700 ft. below the fan location, and equipped with two centrifugal pumps, one of which was lent by the International Coal & Coke Co., of Coleman.

Reopening the Mine—All these precautions having been taken and no explosion having occurred, a small party, including E. Morgan, government mine inspector; H. Gardner, mine manager, and the author reentered the mine on the morning of Nov. 6, carrying rescue apparatus and canaries and reaching the bottom of the airways without difficulty. Work immediately was started on the erection of the steel stopping already described in the rock tunnel leading from the sixth level to the airways, this being completed the same evening. Messrs. Morgan and Gardner and a rescue party using Proto apparatus climbed up the airways to a point 150 ft. above No. 5 level, and here the drying of the timber and mud indicated that hot smoke had traveled almost to the fifth level and then had receded. This recession was attributed to the contraction of the combustion gases on cooling and also possibly to the circulation of air through cracks in the roof of the lower seam.

This evidence of air movement was disturbing because, if fresh air thus circulated, the fire would continue to make progress down the airways, and any such extension of its activity should be prevented at all costs. Erec-

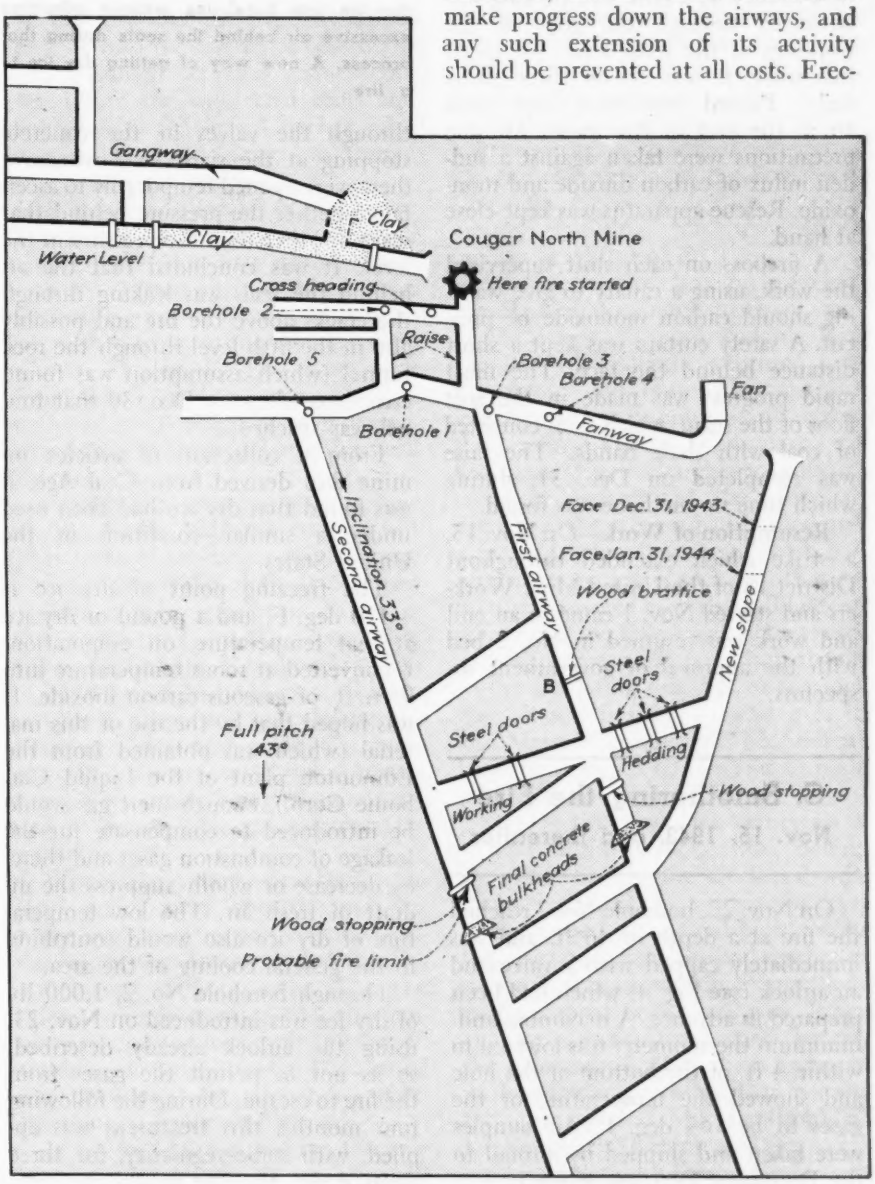

Fig. 3—Plan showing upper end of angled airways, fanway, etc.; also section in close proximity to the fire.

tion of a concrete stopping 3 ft. thick in the rock tunnel of No. 6 level was started immediately behind the steel stopping. This was intended to be absolutely airtight. It was equipped with a manhole and two pipes and valves for air sampling.

On Nov. 7, an exploratory party, equipped with apparatus and canaries, found that methane had already reached the explosive limit only 300 ft. above the sixth level. In consequence, the manholes in the stoppings were bolted tight, and no more exploration was allowed.

Blocking Rock Tunnel in No. 5 Level—To prevent the fire from reaching into the upper bed, should it creep down that far, the rock tunnel from the fifth level to the airways in Bed No. 1 had to be blocked with a concrete stopping. This could be done only by driving a new approach to that tunnel, so a raise 800 ft. long was advanced through the goaf of the workings of the sixth level. To speed this work, it was driven three shifts daily. Forced ventilation kept fresh air at the end of this raise. All due precautions were taken against a sudden influx of carbon dioxide and monoxide. Rescue apparatus was kept close at hand.

A fireboss on each shift supervised the work, using a canary to give warning should carbon monoxide be present. A safety curtain was kept a short distance behind the face. The most rapid progress was made in the soft floor of the seam, which floor consisted of coal with shale bands. The raise was completed on Dec. 31, during which time no methane was found.

Resumption of Work—On Nov. 15, a strike which extended throughout District 18 of the United Mine Workers and started Nov. 1 came to an end and work was resumed in No. 2 bed with the approval of government inspectors.

C. Smothering the Fire

Nov. 15, 1943, and thereafter

On Nov. 22, borehole No. 2 reached the fire at a depth of 46 ft. and was immediately capped with a valve and an airlock (see Fig. 4) which had been prepared in advance. A maximum-and-minimum thermometer was lowered to within 4 ft. of the bottom of the hole and showed the temperature of the gases to be 165 deg. F. Air samples were taken and shipped by airmail to the Dominion Division of Fuels.

Using Dry Ice—Contrary to expectations, the air continued to pull in

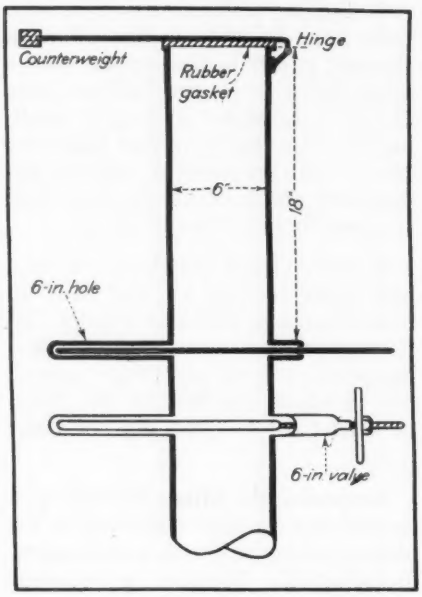

Fig. 4—Air lock provided for introducing dry ice into boreholes without admitting excessive air behind the seals during that process. A new way of getting dry ice to a fire.

through the valves in the concrete stopping at the sixth level whenever these were opened temporarily to ascertain whether the pressure behind that seal was lower than the pressure in the level. It was concluded that the air behind the seals was leaking through the cracks above the fire and possibly also in the fifth level through the rock tunnel (which assumption was found erroneous when on Dec. 30 that tunnel was reached).

From a collection of articles on mine fires derived from *Coal Age*, it was found that dry ice had been used under a similar condition in the United States.

The freezing point of dry ice is —110 deg. F. and a pound of dry ice at that temperature, on evaporation, is converted at room temperature into 9 cu. ft. of gaseous carbon dioxide. It was hoped that by the use of this material (which was obtained from the Edmonton plant of the Liquid Carbonic Corp.), enough inert gas would be introduced to compensate for the leakage of combustion gases and thereby decrease or wholly suppress the indraft of fresh air. The low temperature of dry ice also would contribute to the general cooling of the area.

Through borehole No. 2, 1,000 lb. of dry ice was introduced on Nov. 23, using the airlock already described, so as not to permit the gases from the fire to escape. During the following four months, this treatment was applied, with some regularity, for three shifts daily. As time passed the temperatures taken 4 ft. from the bottom of the boreholes showed an appreciable drop, but, of course, that was largely a local decline and was never taken as being an absolute criterion of the temperature that ruled throughout the fire area. Before the close of 1943, Holes 3, 4 and 5 were brought successively to completion, and they all in turn were used in like manner for the introduction of dry ice, so that the carbon dioxide would spread all over the area.

Fig. 5 shows the temperatures recorded 4 ft. from the bottoms of such holes as were not being used for the introduction of dry ice on the day when the reading was taken. It will be noticed that the drop in temperature was fairly steady.

Sealing Rock Tunnel at Fifth Level—As this work progressed, the raise through the goaf reached the rock tunnel in the fifth level, and a concrete stopping 2 ft. thick was erected in that tunnel and carefully grouted with cement on the sides so as to give a tight seal.

To seal the fire at still closer range, a slope was started Dec. 15 from the outcrop of No. 2 seam close to the fan, as shown in Fig. 3. It was driven straight down the 43-deg. dip. Steel arches were installed in this slope, as it was intended to serve later as a new way of reaching the fan, which is to be moved to this slope from its present position. It was planned to extend it to the airways, which it would reach at points about 400 and 500 ft. respectively below the fan drift.

Use of Rock Dust—Early in January, 1944, W. H. Forbes, safety engineer, National Safety Council, suggested that rock dust be blown down the boreholes for the purpose of covering the burning material with an insulating coat and also to cool the area by the introduction of a fairly large tonnage of solid material at surface temperature; also, so that, in the hottest spots, the ground limestone would be decomposed and its carbon dioxide liberated.

Using the Gases from the Fire—Mr. Forbes' advice was followed, but the author thought that the use of ordinary compressed air would be dangerous. It was decided, therefore, to pump the inert gases out of one of the boreholes and use these gases for injecting the rock dust into the other holes. A four-stage blower developing a pressure of 100 in. water gage was available at the Blairmore Iron Works, its use being suggested by G. A. Campbell, manager of that company. After a few tests, the necessary technique was developed, and 80 tons of rock dust was thus introduced into the fire area from Jan. 10 to Feb. 29, 1944.

The only difficulty arose from the

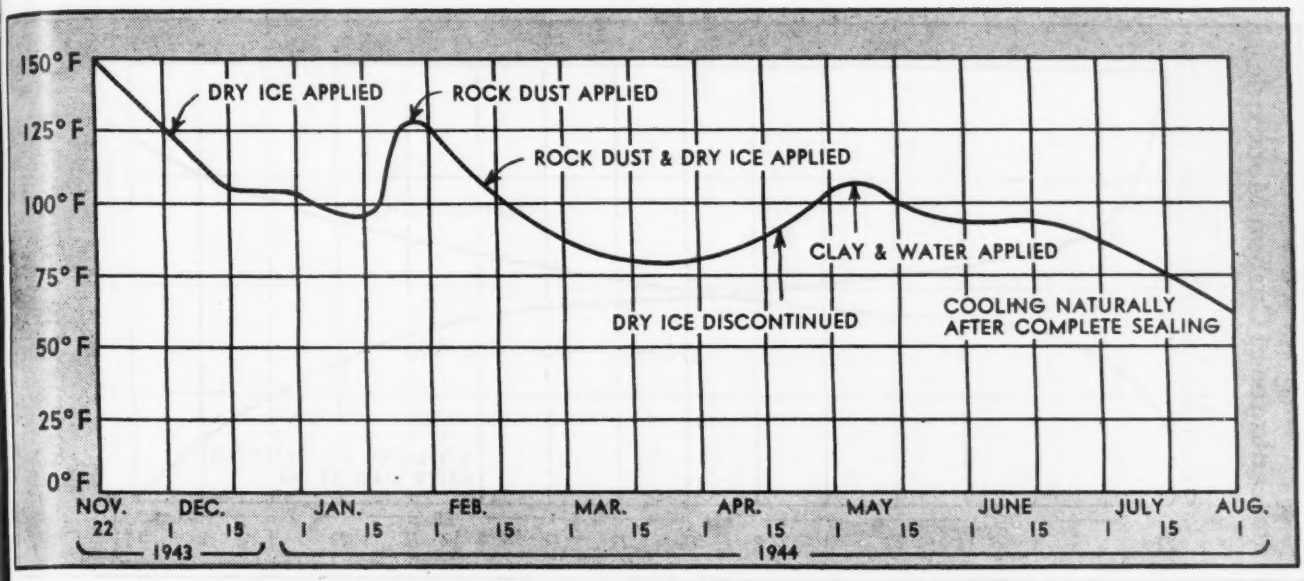
150° F
125° F
100° F
75° F
50° F
25° F
0° F
DRY ICE APPLIED
ROCK DUST APPLIED
ROCK DUST & DRY ICE APPLIED
CLAY & WATER APPLIED
DRY ICE DISCONTINUED
COOLING NATURALLY AFTER COMPLETE SEALING
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Fig. 5—Temperatures 4 ft. from the bottoms of the boreholes at various stages in suppression of the fire.

quantity of moisture formed by the combustion of the hydrogen in the hydrocarbons. This moisture agglomerated the rock-dust particles, causing them to adhere to the walls of the boreholes. Long rods made from 1-in. pipes were used systematically to reopen the holes as soon as they became clogged. Fig. 5 testifies conclusively to the fact that after Jan. 10 rock dust contributed materially to the cooling of the fire area.

Analysis of Gases—At the same time, the percentage of carbon monoxide in the gases collected at the boreholes showed a steady decrease (see Fig. 6), while the concentration of methane kept increasing until it became 22 percent. The oxygen analysis remained fairly constant at about 4 percent. Quite unaccountably, the carbon-dioxide concentration did not increase after reaching 14 per cent, irrespective of the quantities of fresh carbon dioxide continually formed. This can be explained only by the adsorption of carbon dioxide by the coal (part of which had been converted into coke on its exposed surfaces) and also by leakage through roof cracks.

However, all the signs just detailed, especially the fact that there was less than 0.1 percent of carbon monoxide, were held by the end of March, 1944, to furnish sufficient proof that the fire was no longer active, so it was decided that a level heading 50 ft. long should be driven from the new slope to the airways at an elevation low enough that it would in all probability strike those airways below the fire.

Cutting Off the Fire—Prior to holing into the airways, three steel doors were erected in the heading to form an air lock, which prevented both the escape of the combustible gases from the fire area and the introduction of fresh air into those gases. These doors were mounted on steel frames concreted into the solid coal walls and grouted with cement. A perfect joint between doors and frames was assured by a rubber gasket.

Holes were drilled 15 ft. in advance of the face of the heading to avoid cutting into the first airway unexpectedly. When one of these holes eventually pierced it, a thermometer was pushed in, revealing a temperature of only 84 deg. F. The doors were then closed, and a crew of men equipped with oxygen breathing apparatus broke through the last thin wall of coal.

Though the temperature was only 84 deg. F. the moisture content was 95 percent of saturation, which made working conditions difficult for men wearing oxygen apparatus. As far as they could travel up the airway, they saw no sign of fire. It took several days to build two tight brattices in the airway, one above and one below the heading. These were made of a single layer of shiplap coated with plastic wood fiber; nevertheless they continued to retain their gas tightness for several months.

When they were completed, the steel doors were opened, and the water-level heading was extended under forced ventilation toward the second airway, 100 ft. away. The last safety drillhole revealed that the temperature on this airway was 160 deg. F. (middle of April, 1944). This raised a question as to the advisability of attempting to continue the work.

However, as the gases from the hole were absolutely dry, it was thought safe to extend the heading, but before this was done two steel doors were erected to make an airlock close to the second airway. When everything was ready for holing through, 2,000 lb. of dry ice was stored at the face. A 3x3-ft. hole was put through by rescue workers wearing breathing apparatus. On the completion of the hole, they threw the blocks of dry ice into the airway, lowering the temperature quickly to 120 deg. F.

A rescue crew of three men, including H. Gardner, mine manager, and J. McAndrews, superintendent, Rescue Board of Alberta, ventured into the airway and found that the fire had traveled to a point 50 ft. below the heading. Though the intense heat had caused the steel arches to collapse, no great quantity of the roof had caved. All the lagging had burned and a layer of coke about 6 in. thick had formed. A coating of rock dust (6 to 12 in. thick) covered everything. The temperature of the fallen material was estimated to exceed 200 deg., but, thanks to the insulating qualities of the rock dust, it was possible to walk over it, and Messrs. Gardner and McAndrews thought it would be possible to build a bulkhead as planned.

It took two weeks for two crews of trained rescue workers, who, behind the protection of the air locks, wore Proto apparatus, to timber the cave in the second airway and build, below the place which the fire had reached, a strong bulkhead of 8-in. spruce logs, well anchored in the coal ribs. It was extremely exhausting work because the men (nearly all of them firebosses of the company with Mr. Gardner and the mine foreman, Mr. Hamilton) had to climb back 50 ft. on a 33-deg. pitch after completing 15 minutes of work at the bulkhead. Each crew in turn worked 20 minutes, and the total dura-

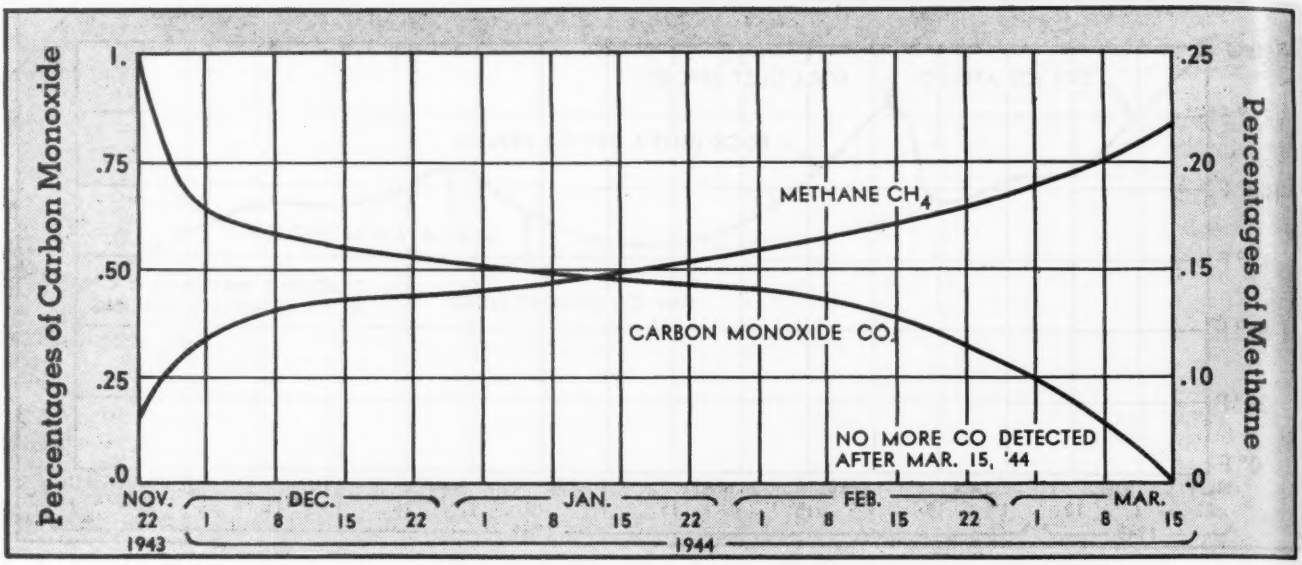


Fig. 6—Methane and carbon-dioxide percentages in period after sealing.

tion of the shift was cut to two hours. By a liberal use of dry ice, about 2,000 lb. per shift, the temperature was kept down to 120 deg. throughout the working period. It is quite clear that without dry ice this work could not have been performed, as the temperature of 160 deg. would have been unbearable for any length of time, no matter how short.

Clay Flushing—When completed, the bulkhead was covered with two plies of brattice cloth, and a 6-in. pipe was installed in the slope and in the work heading. Then a mixture of clay and water was flushed down the pipe until the space between bulkhead and heading was filled with mud.

The first airway was similarly treated, and the work heading also was filled with mud between the two steel doors on either side of the first airway. In this instance the mud was introduced through the original boreholes Nos. 2, 3 and 5, which were located conveniently at the tops of the airways. By the end of April the fire had thus been completely isolated from the lower parts of these airways by thick roof-high deposits of mud.

Completion of Slope—As the intention was to use the slope as a fan drift, in place of the badly damaged airways, it was extended on a curve toward the first airway, which it met below the bulkhead in that raise.

Voiding Combustion Gases—Drillholes 15 feet in advance of the face were used in sinking the extension of the slope, and when the miners had drilled into the first airway, men equipped with breathing apparatus finished the work and freed the accumulated gases, which proved on an average to be lighter than air and traveled rapidly up the slope. The next day the manhole in the stopping of the sixth level was opened, and natural ventilation established. The same procedure was repeated in the second airway.

Final Concrete Bulkheads—Above this new slope, strong bulkheads of rails and concrete were built in the airways below the temporary wood constructions. They also were grouted around the edges with concrete under pressure, so as to make it sure that the fire area would be separated by an absolutely tight barrier from the new fan drift, because the fan, being an exhaust unit, might draw fresh air through the fire area and rekindle the coal. The work was completed by flushing 200 cu.yd. of additional clay down Boreholes 3 and 5. The water that filtered into the slope was perfectly clear, proving that all cracks had been well sealed. Control pipes with valves were sealed into the bulkheads.

At the time this was written, Sept. 25, 1944, the temperature of the gases had been reduced in all boreholes to about 60 deg., making it reasonable to suppose that the fire is out.

Conclusion—By the use of a combination of modern methods—dry ice, rock dust and hydraulic flushing—it was possible at the Greenhill colliery, within a period of six months (November, 1943-April, 1944), to slow down and then extinguish a shallow underground fire—the hardest kind of fire to fight. In the process, 130 tons of dry ice, 110 tons of rock dust and 660 cu.yd. of clay were used. While more conventional methods might have been adopted, the threat to a very valuable mine and the unusual circumstances surrounding the fire made it imperative to use, without delay, the most potent means available. It is my opinion that:

1. The formation of a thick cover of clay over the outcrop checked the fire in its early stages.

2. The use of dry ice further retarded the progress of the fire and to a large extent prevented it from reaching the goaf in the upper bed. It also cooled the passageways sufficiently to make possible the work of the apparatus men in April when the fire area was reentered.

3. The use of rock dust, injected by means of inert gases generated by the fire itself, also helped to cool the fire area and probably sealed cracks in the roof which, until it was applied, allowed the atmosphere with its inert gases to leak.

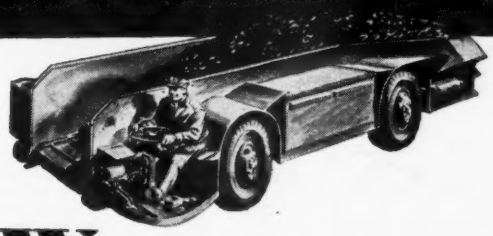
4. The flushing of clay above the bulkheads, erected with the help of the foregoing means, gave the fire extinction its final touch.

5. The steel supports in the airways with only partial wood lagging probably limited both the intensity of the fire and its rate of progress. However, had 200 ft. of the fan drift been concreted, all danger of fire from external sources would have been eliminated. In consequence, the new fan slope will be thus protected.

The staff of the Greenhill mine should be congratulated on its hearty response to the needs of this emergency and on its heroic work. Acknowledgment of their advice and assistance is due Mr. McAndrews, superintendent of rescue, Province of Alberta; B. Cawfield, general superintendent, Crowsnest Pass Coal Co.; J. McIntyre, general manager, International Coal & Coke and McGillivray Cos., and B. F. Haanel, chief of the Division of Fuels, Ottawa.

POWER

EXIDES AND SHUTTLECARS — THE TEAM THAT KEEPS PRODUCTION AT ITS PEAK



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Ventilation Sweeps Goaf and Faces

In Room Entries Three Intakes Are Provided to One Return as Air Bypasses to a Permanent Bleeder Mainly Over Rock Falls

TO OBTAIN at a stroke both safety and efficiency, operating companies today are holding conferences and taking pains to develop systems of working suited to their specific conditions and are entering into minute detail regarding every phase of operating procedure, especially ventilation. This is well illustrated by the ventilation standards established by the Koppers Coal Div., as presented by Stephen Krickovic, assistant chief engineer of the company, at the recent session of the Coal Mining Section of the National Safety Council (see Fig. 1). In the development, special consideration has been given to ventilation, particularly to the distribution of air. What follows refers solely to the broad outlines of ventilation and the coursing of the air and not to minute details of the construction of the several controlling elements.

Directs Flames to Waste

These revisions of method have been labor- and material-saving. Satisfaction is felt also because by the methods provided a mine fire, should it occur, can be expeditiously controlled. Such fires, of course, project their flames in the direction of the air current. If then this current is arranged to travel into an area like the goaf, where there is rock above, below and

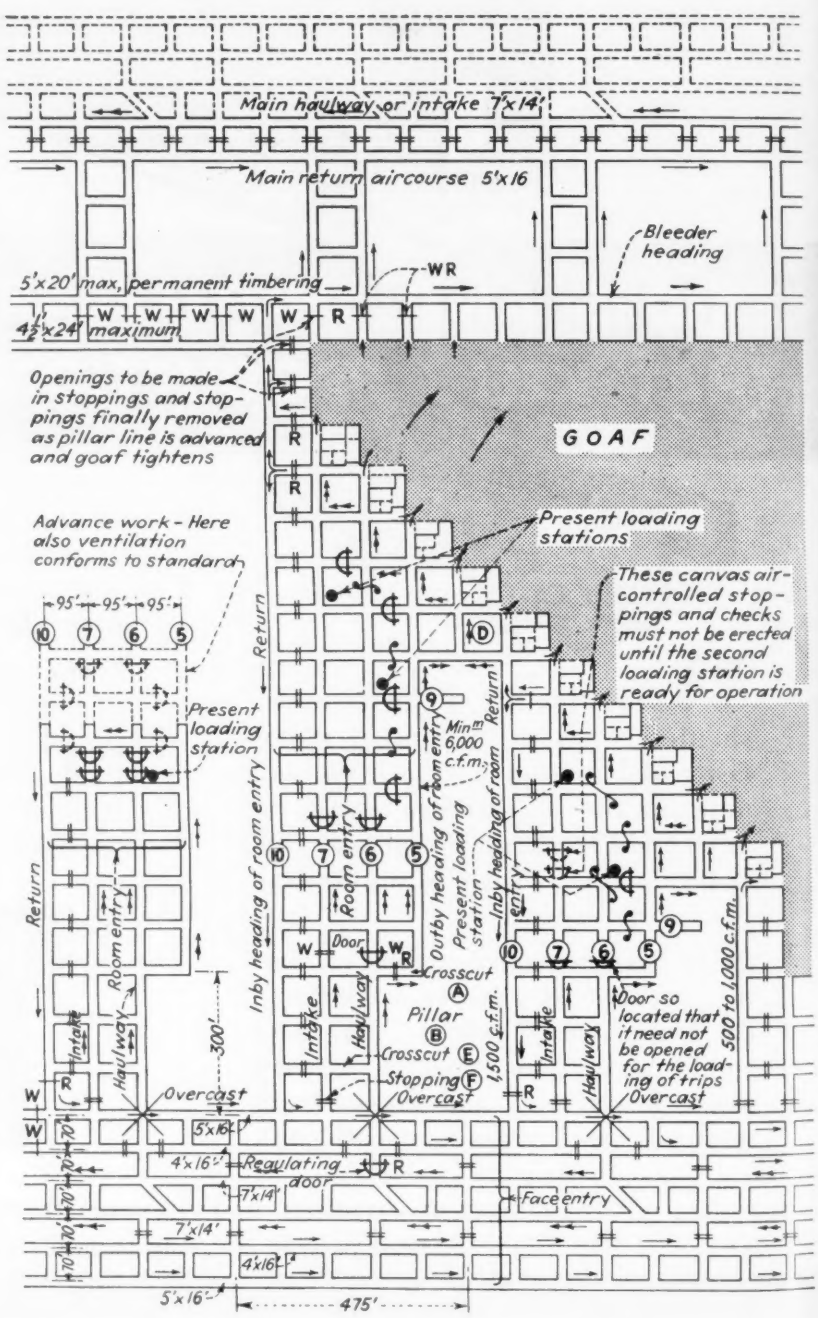
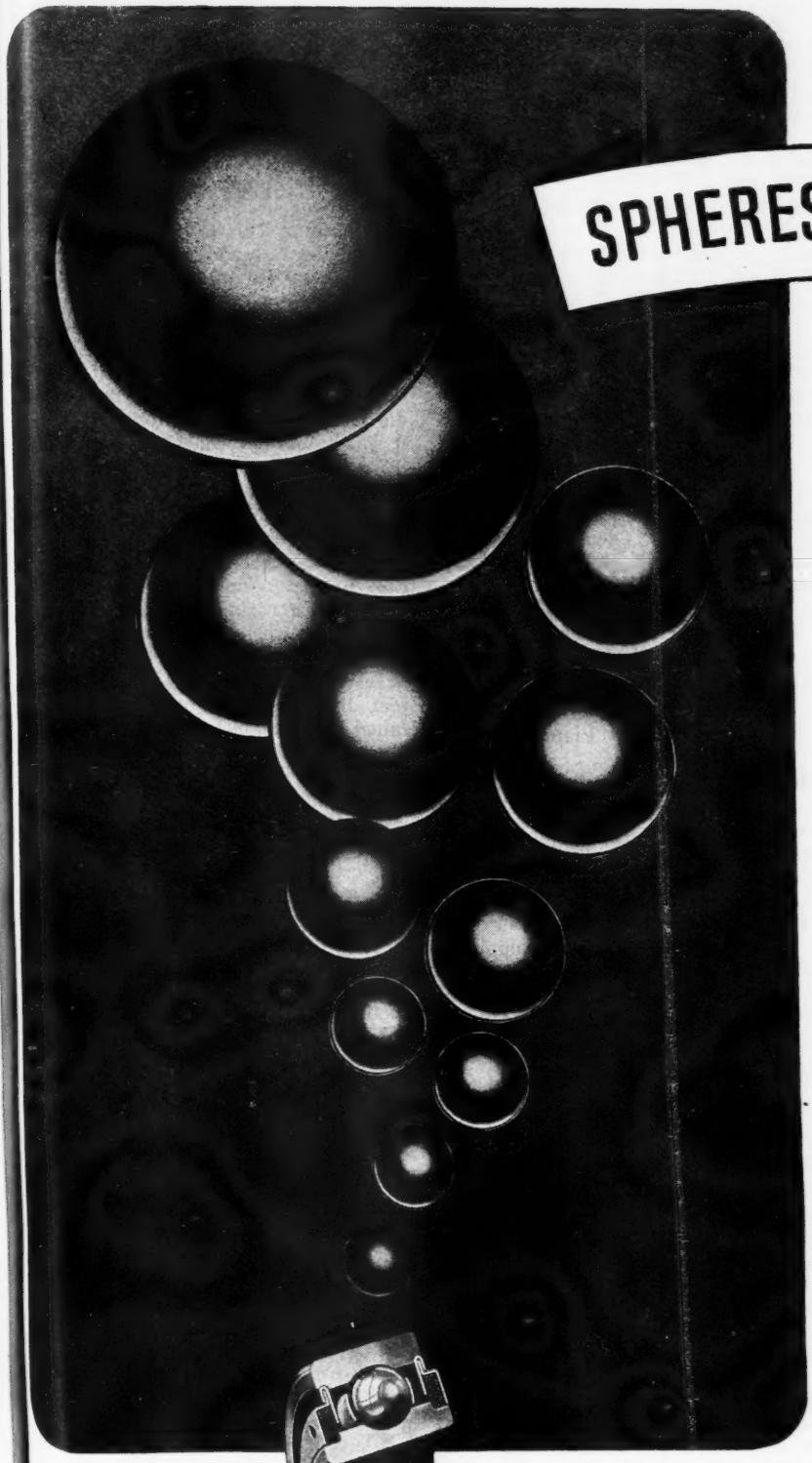


Fig. 1. With this arrangement both goaf and haulways are well ventilated, air travel is shortened, cross-sectional area of part of the air's travel is increased and resistance is accordingly decreased.

Legend

- Intake air current (two arrowheads)
- Return air current (one arrowhead)
- Overcast
- Permanent stopping
- Temporary non-combustible stopping
- w Wood stopping
- Canvas stopping
- Canvas check
- Door
- R Regulator
- Loading machine



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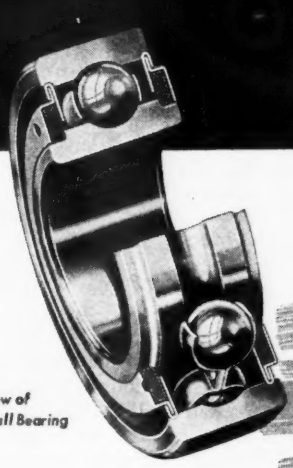

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all around, the flame will find no combustible in its path on which to feed but only a vast cooling chamber, and it will be easy to extinguish it, because it will be less hot and extensive than a fire passing through a flammable return with cross timbers, posts, brattices and coal in the line of its travel. Its explosive, poisonous and noxious gases also will be "drained" away from the working areas, thus reducing hazards and facilitating the escape and rescue of men. The vast extent of the chilly goaf also will act as a wet blanket on the flames. However, the goaf should be coal-free or the fire may invade fallen bone or perhaps crushed coal, "fenders" and "stumps." Unfortunately, this coaly material may be so protected by fallen rock that the water distributed by the fire fighters may be made less effective.

At the Koppers mines, face entries consist of four intake and only two return headings, despite the fact that, because of the steady emission of methane from the coal faces, a little more air usually has to be carried in the returns from mine workings than has entered through the intakes. But, in the Koppers system, much of this return air—that part which passes the freshly fallen face coal and does not merely ventilate the headings—is passed to the goaf falls. Thence it travels either by special headings paralleling the main intake face headings or through the returns of an outby face entry which has already served its main purpose and been driven to its ultimate length. Though its rooms have been worked out, its ample pillars are still left so intact that these return airways will still be open and relatively free from falls. In the butt or room entries, there is an even greater inequality in the gross capacities of intakes and returns, three intake headings being provided for only one return heading and that heading as low as the lowest of the other three.

Wing Pillar at Face Entry

However, the outby airway of the four headings does not stem from the face entry but is started from a crosscut, *A*, 300 ft. distant from the face entry, said crosscut being long enough to leave a 71-ft. pillar or more between the two headings. This delay of 300 ft. in driving the outby heading enables a pillar, *B*, measuring 300x300 ft. to be provided for the protection of the face entry. In this way an offset in the room entry is provided somewhat similar to the offset provided when a room is widened, for eventually the pillars are drawn back to this offset and then the outby side of the crosscut becomes part of the outby edge of the goaf. Thus the butt heading is provided with wing protection 300 or more feet wide which remains in place until the heading pillars are extracted.

In the room entries, the headings and crosscuts are so driven as to provide for pillars 71x79 ft. or thereabouts and the distance left between the outer headings of each pair of room entries leaves space for two other pillars side by side which, on retreat, will be developed by extending the crosscuts and splitting, by a heading, the pillar thus made, as shown in the illustration at *D*. All the headings are 16 ft. wide and the crosscuts not over 24 ft. in width. The outby heading of the room entry (marked No. 5 in the illustration), which has to provide for the shuttle cars, is 5½ ft. high, being of seam-thickness-plus-drawslate height. As the adjacent heading, No. 6, is used for car haulage, it is made 6 ft. high.

Next to this heading is the "intake heading," so called No. 7, which is 4½ ft., or only seam thickness, in height. The inby heading, No. 10, which carries the return air, also is 4½ ft. high except at intersections where the drawslate is taken down. The capacity of the intake headings is 3.56 times as great as the capacity of the single return airway, neglecting, however, those important interferences interposed in the intake headings by the presence of shuttle cars, lengthy car trips, indirect approaches, diversions, doors, regulators, canvas checks and canvas stoppings. However, as has been explained, the return airway takes only such air as does not pass to the goaf. It is, moreover, direct and unhampered by regulators.

Features of Plan

The essential features of the plan are:

1. Overcasts are provided only at the entrance of each haulage road where it leaves the face entry (thus there is one only for each room entry). The so-called intake heading, No. 7, which stems from the face heading also would need an overcast if heading No. 6 did not supply it with air through a crosscut at *E*, not far from the face heading, the direct approach from the face heading being closed by a stopping at *F*. As noted, No. 5, on the other side of No. 6, also received its air from a crosscut. In this way, a single overcast serves not one but three intake headings. This arrangement enables the air in a section to be split, right or left, as often as the quantity of methane evolved requires. Separate splits for retreating room headings are desirable, not only because by them the air is controlled more safely but also because any fire that may occur in an active section can be better held in check.

2. As two machines are loading coal on one continuous pillar line and as these machines need ample air for their safe operation, an air split which starts in the outby retreating room heading, No. 5, is conducted along the pillar line to the inby retreating room heading, No. 10, which is the return aircourse of the room entry.

3. Adequate canvas is provided to lock the air flow along the pillar line. Because this flow must be reliably controlled by canvas in shuttle-car sections and to a smaller extent in track-machine sections, the checks, stoppings and line brattices must be properly erected and maintained, and standards for these have been established.

4. A continuous permanent "bleeder" heading connected to the goaf by crosscuts at 95-ft. centers is provided at the back end of the main face heading. It is noteworthy that, though this "bleeder" heading probably will not be required in any but highly gassy mines, it is not an uneconomical provision, for it can be made to serve as a main return, and thus it renders the return which parallels the room-heading intakes of less significant importance. Otherwise, it would be necessary to provide one or more additional returns in every room heading. Thus one permanent heading removes the need for several impermanent headings; these, however, eventually would afford access to pillars as does also the permanent heading when its turn comes to be withdrawn. With room headings on not over 400-ft. centers the return air can be forced in most mines over the goaf falls with only a reasonable difference of pressure. Moreover, because it will be possible when barrier pillars are being retreated, to place haulways in fresh air on both sides of such pillars, such a bleeder will render it easy to provide sufficient air throughout that important phase of mine operation.

5. Regulators must be so located as to provide for a maximum pressure differential across goafs where pillars are being drawn and, wherever feasible, regulators should be placed on the return of splits to prevent the air being completely short-circuited should air-lock doors be left open or torn down. In short, the return of air through the goaf should be easy but not wholly unregulated.

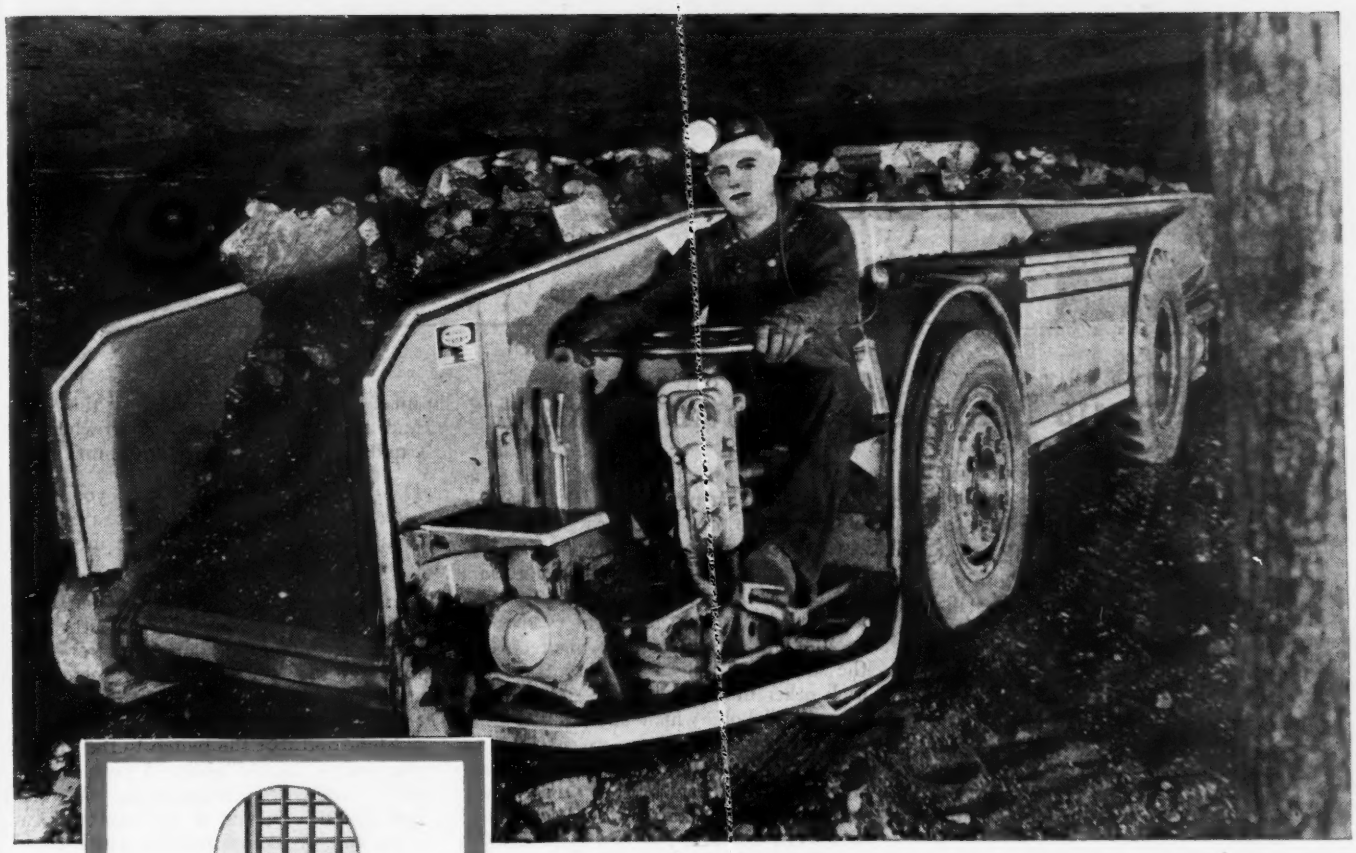
This ventilation system is as foolproof as can be practically attained. It is rather simple to follow and not too costly, especially as much of the material used can be recovered and used again.

Another plan for operation in a gassy mine with two conveyors instead of two mobile loaders contemplates, as in the example just described, rooms on only one side of a room entry with arrangement and control of ventilation by individual room-entry splits and a continuous permanent "bleeder" heading, all basically similar to the mobile-loader plan already outlined.

The Incombustible Goaf

In either plan, as the connections in turn are made, the air leaves the working places in twice as many splits as there are blocks of coal along the break line, and each active block of coal gets air unvitiated except for the impurities received in its passage through inactive narrow work. There are no large areas to harbor methane because the blocks are not unduly large and because, when the crosscuts reach the goaf, the circulation carries the gas into that immense space the goaf, from which it is bled through a multiplicity of crosscuts to the bleeder return.

Though bleeders to the return airways of an adjacent heading have long been used in Pennsylvania, especially around Pittsburgh and the anthracite region, they have only of late received the full attention to which their value entitles them. The only large open spaces in the mine are the goafs. Wherever these are readily ventilatable and are ventilated, they provide ample space for free ventilation with minimum resistance. They often develop only moderate volumes of methane and, if ventilated, will contain at any time small quantities of that gas.



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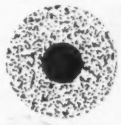

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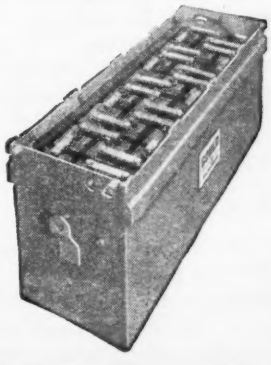

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State-Board Questions

Bituminous Mine Electrician, Penna.

Q.—What are the legal duties of the mine electrician?

A.—It is the duty of the mine electrician to assist the mine foreman in meeting all the requirements of the bituminous mining laws relating to the installation and use of electricity in bituminous mines and to the equipment powered thereby, and, for any violations of these laws, he is subject to the same penalties as the mine foreman.

Q.—How can mixtures of methane and air enter the casings and inclosures of explosion-proof motors? Explain in detail.

A.—No casings or other inclosures of explosion-proof motors are absolutely gastight and, that being so, diffusion can carry methane into them. More important is the "inbreathing" of air caused by the cooling of the atmospheres in the casings and inclosures when the power is switched off the equipment, for then the metallic parts of the equipment cool and so do the casings and inclosures and the atmosphere in these spaces contract so that, though they will continue to fill the space allotted to them, they will do so only by a lowering of the pressure that they impose on the walls of the inclosures. Accordingly the inner pressure is less than the outer pressure, and air enters from outside the equipment. Often the air thus introduced, which can enter through extremely small openings, fills a large percentage of the space in casings and inclosures. But that is not the main hazard. The danger is that explosive gas may cook out of the insulation, and the gases may well be such as to have a lower explosive limit than methane.

Q.—(a) How often should explosion-proof motors and switches be opened, thoroughly inspected, cleaned and repaired?

(b) Define explosion- or flameproof casings or inclosures.

A.—(a) Motors should be inspected at least once a week and switches once a month.

(b) When a mixture of methane and air is exploded in an explosion- or flameproof casing or inclosure, the flame is prevented from reaching the outside of such a casing or inclosure either (1) by the tightness and strength of the inclosure or (2) by the fact that the passages of escape for the products of the explosion are so narrow that the heat of these products is communicated to the covers and walls of the inclosure in such measure that when the products arrive at the outer surfaces of the inclosure they have become so cooled that they are incapable of igniting methane no matter in what proportion it is mixed with air or how close such methane may be to such points of escape.

Such inclosures become ineffective if the covers and walls are farther apart from each other than specified by the manufacturer, or if bolts which hold the inclosure together are omitted in its assembly or are imperfectly tightened. Feeler gages are used to ascertain whether these covers and walls are separated by less than a maximum distance, which usually is 0.004 in. Design 2 closely parallels the design of the safety lamp where the ports for the admission of air are so narrow and irregular and the passages through the gauze are so small as to assure the cooling of the flame and so prevent its emergence when an explosion occurs within the lamp.

Q.—What examination would you make before attempting to repair a mining machine at the working face in a gassy part of a mine?

A.—I would examine all the sources of power to the machine to see whether the power has been disconnected from the machine and that the trailing cable nips and return are so disposed that they cannot conduct stray electric currents to the machine and that the switch to the mining machine is locked open. I would then with a safety lamp examine the roof, face and ribs to ascertain if any explosive gas is present. If there is no such gas, I would proceed to repair the machine. Should it be found necessary to test the machine, I would use an approved instrument for that purpose.

State Inspectors, Illinois

Q.—What pressure will be required to force 20,000 cu.ft. of air per minute through an airway 14 ft. wide, 6 ft. high and 3,000 ft. long? Use the Fairley value for coefficient k, which is 0.000 000 01.

A.—The perimeter, or girth, of the airway is $(6 + 14 + 6 + 14) = 40$ ft., and its area = height × width = $6 \times 14 = 84$ sq.ft. If 20,000 cu.ft. passes through the airway per minute, and the air is assumed to be traveling at an equal speed at every point in the entire cross-section, then each square foot of the cross section will take $20{,}000 \div 84 =$ about 238 cu.ft. per minute. Hence it can be recognized that the velocity will be about 238 ft. per minute. The rubbing surface will equal length of airway multiplied by perimeter of airway = $3{,}000 \times 40 = 120{,}000$ sq.ft.

$$\text{Then, pressure} = p = \frac{ksv^2}{a}$$

$$\text{and } p = \frac{0.000\,000\,01 \times 120{,}000 \times 238^2}{84}$$

$$= 0.808\,876\,32 \text{ per square foot}$$
$$= \text{about } 0.8 \text{ lb. per square foot.}$$

The Fairley value for k is not the lowest figure that has been determined. T. W. Fitch Jr. gives a figure only about one-third as large. However J. J. Atkinson's figure, which is more than twice as large as Fairley's, usually is preferred because it represents more usual conditions and leaves a margin for safety. Atkinson's figure is 0.000 000 0217.

The value of k being so variant, dependent on the condition of the airway, and uncertain, because of inaccuracy in measurement, one cannot hope for any exact calculation of the value of the pressure needed, so it is not well to retain too many decimals as they will give a false impression of the accuracy of the computation.

Q.—The cross-section of the intake airway of a mine is 5x10 ft. and an anemometer indicates an air velocity of 500 ft. per minute. If the barometer in that airway registers 30 in. and the temperature is 70 deg. F., what weight of air passes through the mine in 24 hours?

A.—The cross-sectional area of the airway is $5 \times 10 = 50$ sq.ft. Assuming the anemometer reading is the average velocity of the air current, the quantity delivered will be $50 \times 500 = 25{,}000$ cu.ft. per minute. At a temperature of 70 deg. F. and a barometric pressure equal to that of 30 in. of mercury, the weight of a cubic foot of air

$$W \text{ will be} = \frac{1.3273 \times 30}{460 + 70} = 0.075\ 13 \text{lb.}$$

The weight of air entering the mine in 24 hours therefore is

$$\frac{\text{Minutes in day} \times \text{air per min.} \times 0.075\,13 \text{ lb.}}{\text{Number of pounds in a ton}}$$

$$= \frac{(60 \times 24) \times 25{,}000 \times 0.075\,13}{2{,}000}$$

$$= 1352.34 \text{ tons.}$$

Q.—What atmospheric conditions can be measured by the following instruments:

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anemometer, barometer, hygrometer, thermometer and water gage?

A.—*Anemometer* measures velocity of air current.

Hygrometer measures moisture saturation of air.

Thermometer measures temperature of air.

Water gage determines difference of pressure between two points nearby each other, usually on opposing sides of a stopping.

Air under a given pressure and temperature is able to take up a certain quantity of moisture. This is known as its saturation point. However, the air in a mine may be carrying less moisture than that. The hygrometer when used in a mine shows what percentage of that quantity is to be found in the mine at that point.

Complete in Themselves

Q.—In what way will variations in anemometer, barometers, hygrometers and water gages affect each other?

A.—Each of these instruments operates independently and gives results correct within certain limitations, depending on the ability of the observer to read them and on other factors. The anemometer, for instance must be calibrated (tested for accuracy and adjusted to give approximately correct results); it must be placed in representative locations in the airway for definite times so as to give the correct mean of all the various air velocities in proportion to the size of the areas to which they apply; it must be free from obstruction by the body of the observer; the air should be going straight ahead at the place where the measurement is taken; the air should be traveling at right angles to the plane of rotation of the vanes; no disturbing posts, crossbars, fallen rock, heaved bottom, uneven ribs or even rails and ties should be present for perfect accuracy. Given all these, the measurement will nevertheless not be wholly accurate. But it will be in need of no correction by any other observations.

The barometer, however, gives the pressure in inches of the mercury being used for the determination of the pressure and its weight per inch varies with its temperature, as related to a standard temperature. Consequently, for extreme accuracy, correction should be applied where the temperature is not normal—say 60 deg.—or as compared with the temperature of the air at the surface above the mine. If you should desire to find the weight of air being moved by the fan, as the anemometer gives only the volume at mine temperature, any comparison with air of a different temperature would require a conversion of the volume figures to get comparisons of weight. The figures are correct as given by all the instruments but when comparisons are made or deductions drawn, it may be necessary to consider the readings of other instruments than the one directly involved. Thus moisture saturation affects weight of air, and this would bring into consideration the hygrometer determination when considering air weights.

Q.—An airway 8x12 ft., 4,000 ft. long, has 38,800 cu.ft. of air passing per minute. Find the rubbing surface, pressure and horsepower on or in the air.

A.—*Rubbing Surface* of airway will be perimeter of airway $(8 + 12 + 8 + 12)$ multiplied by the length of airway $= 40 \times 4{,}000 = 160{,}000$ sq.ft.

$$\text{Velocity of air} = \frac{\text{volume of air}}{\text{cross-section of airway}}$$

$$= \frac{38{,}800 \text{ cu. ft.}}{96 \text{ sq. ft.}}$$

$$= \text{about } 404 \text{ ft. per minute}$$

k is taken in this instance as 0.000 000 02 (J. J. Atkinson's coefficient of air friction)

$$p = \frac{ksv^2}{a} = \frac{0.000\,000\,02 \times 160{,}000 \times 404}{96}$$

$$= 5.44 \text{ lb. per square foot}$$

The horsepower which this air must possess to overcome the resistance

$$= \frac{\text{Quantity} \times \text{pressure}}{\text{Foot-pounds in one horsepower}}$$

$$= \frac{38{,}800 \times 5.44}{33{,}000} = 6.4 \text{ hp.}$$

A horse is supposed to be able to lift 33,000 lb. a foot in one minute, but actually a horse will not continuously do so much and some will never do it.

But That Is Not All

But this is the horsepower which the air possesses, not the power needed to give it that horsepower. Suppose the fan has an efficiency of 70 percent and the motor of 90 percent and of the two together 63 percent, for the fan will transmit 0.70 of the power furnished it by the motor, and the motor will transmit 0.90 of the power furnished it by the electric current, so all the air will get will be 0.70 of 0.90 of the electricity used, or 0.63, which is 63 percent, so the horsepower will need to be $\frac{6.4}{0.63}$ = about 10 hp. Remember also this does not include losses of power in the power station and between the power station and the fan, which may readily add another 2½ hp. if the distance is considerable. Never be decimal-minded. Always recall the bitter fact that dollars fairly drip from any lengthy system of communication of any kind and that toll is taken at every piece of equipment set in motion as well as by the resistance of the air. It is a lazy world and takes power to put it in operation, and power is needed to compress air even to a few inches of water gage.

Q.—As mine inspector, how would you proceed to examine a mine so as to assure the safety of the men employed?

A.—A new inspector, before making his first mine examinations, should study the mines in his district and become acquainted with their officials. Assuming, however, that the inspector is fully acquainted with the mine which he is about to examine and that he has inspected the mine map and has a complete understanding of the ventilating system of the mine, the drainage system and the extent of its workings, he should visit the mine unannounced. If he can get in touch with the foreman without giving him time to rectify improper conditions, he will do well to go into the mine with him, discussing with him such features as need betterment.

Today, with telephones, it is almost impossible to visit a mine without the knowledge of the foreman or to prevent him from utilizing the opportunity to improve temporarily some defects in the mine, prior to inspection, unless indeed the inspector finds him and takes him along with him, and even then he may explain that his presence is needed at some distant point and use this opportunity to telephone to someone to have the defective conditions remedied.

However, if the foreman telephones that he is busy and must be excused or he is not readily available, the inspector perhaps should be gratified and make the trip alone. But first he should examine the fan and ascertain with his anemometer how much air it is delivering and determine with his lamp as best he can how much methane is present in the air. He should examine the haulageways carefully to see if the track is well laid; if the trolley wire, if there is any, is correctly aligned vertically and horizontally and well supported and if the heading is properly rock-dusted and kept clean. Unfortunately, the laws of Illinois are defective and require rock-dusting only "for a distance extending from the third crosscut from the working face at least 1,000 ft. outby in each working section." No standards are specified in the Illinois laws for the proper erection of trolley wires. Nevertheless, the inspector, for the benefit of the operator and his employees, should use his best endeavors to have the operator correct such conditions when correction is needed.

Measure Air in Split

Proceeding to examine the working faces, the inspector should start inby to the mouth of a section. There he should measure the air current passing into that district. He should inspect in order each working place, talk with the men and give them any needed instruction. He should measure the air at the last crosscut in the section and note any decrease of air due to leaky stoppings.

In the same manner he should proceed to examine each section of the mine, noting on his way the condition of all roads, aircourses, crosscuts and traveling ways, paying particular attention to haulage practices, electrical installation and shooting methods; the presence or absence of circuit breakers and sectional electric switches; the use of parallel-throw track switches; the condition of rail bonds, etc. Ventilation, timbering and drainage should be given painstaking attention.

On reaching the surface, after completing his examination below and having inspected the condition of the shaft gates, ropes, safety catches, cages and other equipment on which safety depends, the inspector should proceed to the engine room and inspect every detail of the hoist and he should also examine the washroom or wash house, ending his examination by posting a notice giving the results of his observations and making such recommendations as his judgment and experience may dictate.

Why is FALK a good name in industry?

A business institution acquires a fine reputation, not because of its size, not because of the dividends it pays, not because of the patents it holds; but because of the acceptance of its products and methods of doing business by prospects, by customers, and by its employes.

For over fifty years prospective customers for Falk products have been gracious in their acceptance of Falk representatives.

Actual customers have purchased and repurchased Falk products year after year.

Falk employes are proud to be associated with the Falk Corporation, and verify their pride by many years of service.

This is evidenced by the Navy's acceptance of Falk products since before World War I; by the attitude of the Falk management toward Falk employes during the lean years of the economic cycle; by the honors bestowed upon Falk officials; by recognition of the high standards of its employe relations accorded by a national magazine; and by interplant and office activities of the employes themselves.

It has long been an axiom of the Falk management that "to build a better product, first improve the man." Falk quality is due in no small measure to the thoroughness of Falk apprenticeship courses.

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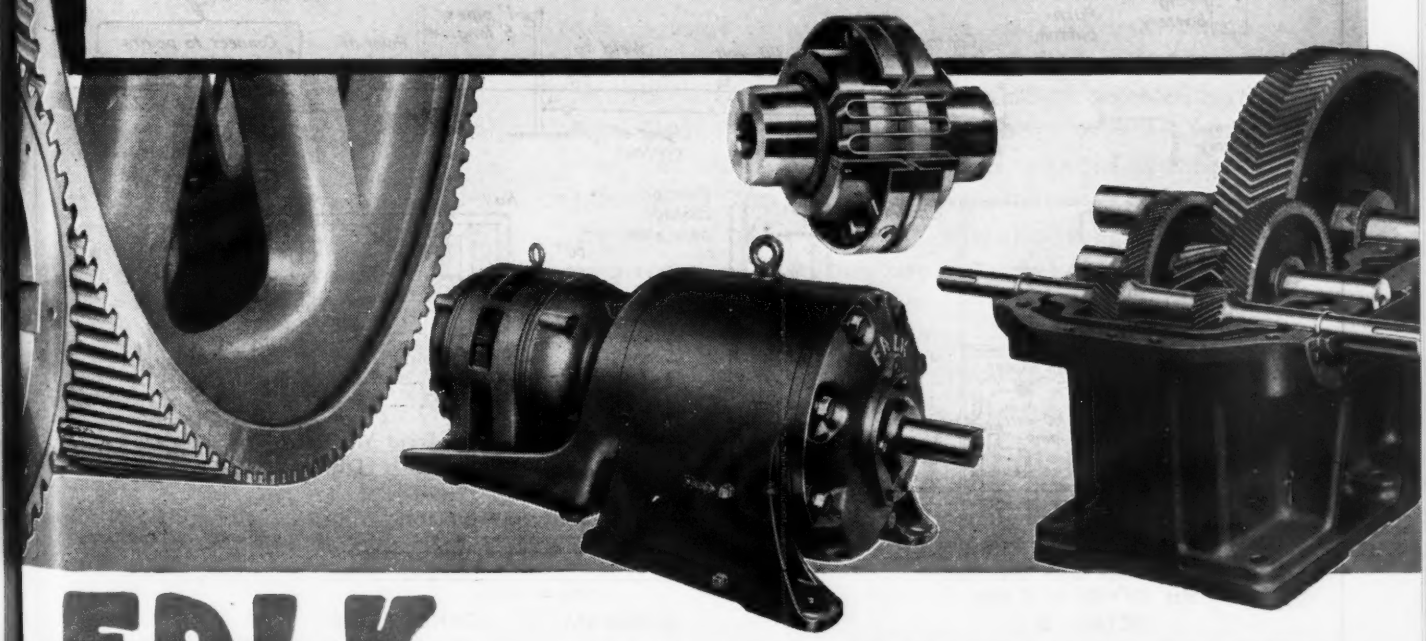
To secure the watch-like precision so characteristic of all that Falk produces, it has always been the Falk policy to design its own machinery.

Because Falk has always known its men, its material, and its tools, it logically follows that Falk engineering has always been better than it could have been, had this engineering been done with unknown components.

All of this is just plain good business. No reputation can ever be acquired, much less maintained, unless it is based on plain good business. For plain good business is business that is good first for the customer, then for the employe, then for the corporation—and only then for the management.

This is why Falk is "a good name in industry".



FALK...A GOOD NAME IN INDUSTRY

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Operating Ideas

Preventing Premature Blasts in Electrical Firing

By JOSEPH V. MATHER
Mining Explosives Engineer,
Coal Mine Inspection Division
U. S. Bureau of Mines
Wilkes-Barre, Pa.

MANY accidents have occurred in the Pennsylvania anthracite field from premature detonations of explosives by stray currents of electricity passing through coal, other measures or objects. Before a premature blast can occur, however, the following conditions must be present:

1. One of the lead wires must touch an electrically charged object, material or vein.
2. The other lead wire must touch a rail, sheet iron, pipeline or other object at near ground potential.
3. There must be a difference in potential of at least 0.75 volt between the lead wires and a current of at least 0.34 amp.

Published by permission of the director, U. S. Bureau of Mines.

must flow (*The Canadian Mining Journal*, June, 1943, p. 368).

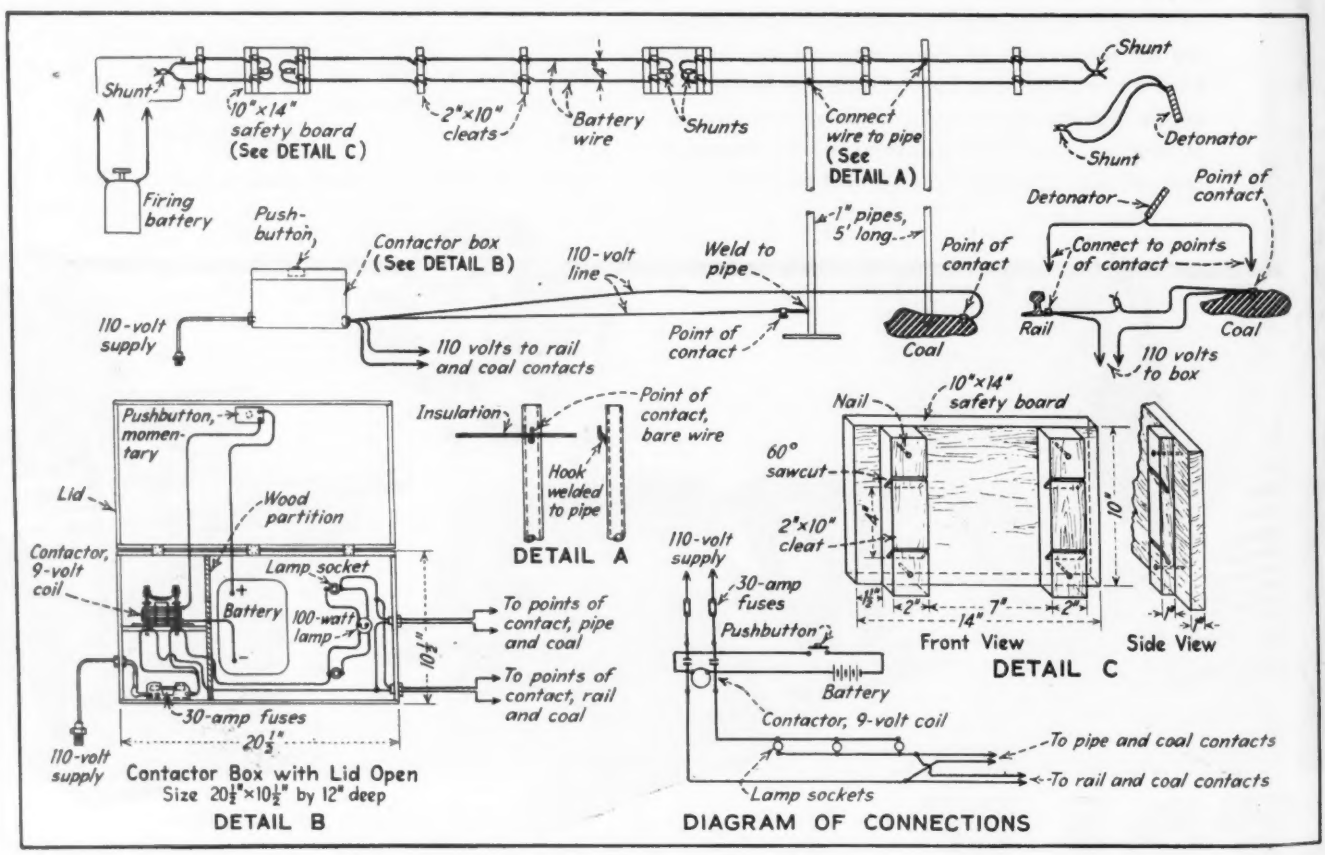
Elimination of stray currents may be impossible but reasonable control may be maintained by properly bonding return electrical circuits. Miners blasting by electrical methods should be taught to regard every surrounding surface as a source of electrical power and to isolate or insulate the bare ends of detonator leg wires and blasting lines. The chief precautions against stray currents of electricity are to keep electric detonators short-circuited until the moment of connecting them to the blasting lines and to keep the blasting lines short-circuited until the moment of connecting them to the power source.

During recent inspections of the collieries of the Lehigh Valley Coal Co., demonstrations were conducted to show miners the value of short-circuiting blasting lines to prevent premature blasts from stray electric currents.

The equipment required to make a demonstration is shown in the accompanying illustrations. It consists of:

1 1x10x14-in. board (safety board).
6 1x2x10-in. wood strips (cleats).
100 ft. No. 20 annunciator wire.
1 10-shot magneto-type blasting unit.
2 1-in. pipes, each 5 ft. long.
2 attachment hooks.
1 piece iron 1 in. wide, 8 in. long.
1 piece iron 1 in. wide, 4 in. long.
2 copper contact screws, 4 in. long.
1 piece anthracite 2x2 ft. about 8 in. thick.
75 ft. No. 12 rubber-covered copper wire.
1 9-volt coil contactor.
3 lamp sockets.
1 pushbutton.
1 large dry-cell battery.

(Continued on page 114)



Equipment and set-up of demonstrator for showing value of short-circuiting as a protection against stray currents.

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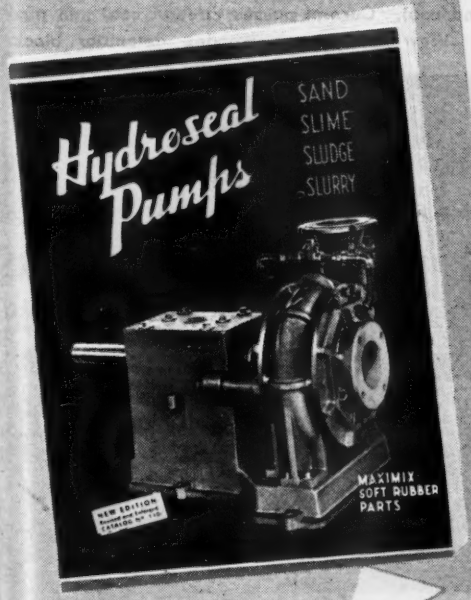
Today it is not necessary to dump your rock refuse near your tipple or breaker, because it is too costly to transport it any distance away. The Hydroseal Pump is specially designed for handling abrasive rock, sludge and sand. The rock refuse photographed was picked up at the end of a Hydroseal Discharge Line, after being pumped several hundred feet. Pipelines can be a mile or more long, they can cross creeks or ravines without expensive trestles. . . . As compared with trucking or hauling by narrow gauge railroad, installation and operating costs by pumping are extremely low. Weather does not bother pumping and if water is scarce, it can be recirculated. Send for Catalog No. 140, or write us about your refuse disposal problem, so we can answer with definite suggestions.



THE ALLEN-SHERMAN-HOFF CO.

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WRITE FOR THIS CATALOG

Preventing Premature Blasts in Electrical Firing *(Continued from page 112)*

1 wooden box 20½x10½ by 12 in. deep.
1 5x7-in. hardwood block 2 ft. long with 1⅛-in. hole 16 in. deep in one end.
1 pair wire cutters, insulated handles.

The demonstrator is erected as shown in the illustrations. To conduct the demonstration, a detonator is placed in the hole in the hardwood block and then is attached to the firing ends of the blasting lines. The short circuits in the blasting lines are removed, the 10-shot blasting unit is attached at the battery end and the detonator is fired. The detonator is placed in the block to prevent pieces of metal from flying. Care must be observed in this respect.

The blasting lines then are short-circuited at the battery end and at the safety break as shown in an accompanying illustration. A new detonator is placed in the wooden block and attached to the blasting lines. Next, the 1-in. pipes are connected to the blasting lines. One extends from one line to the ground and the other from the second line to the piece of anthracite. From the contactor box one No. 12 wire of a pair of leads is connected to the anthracite and the other to the iron pipe, which is resting on the ground.

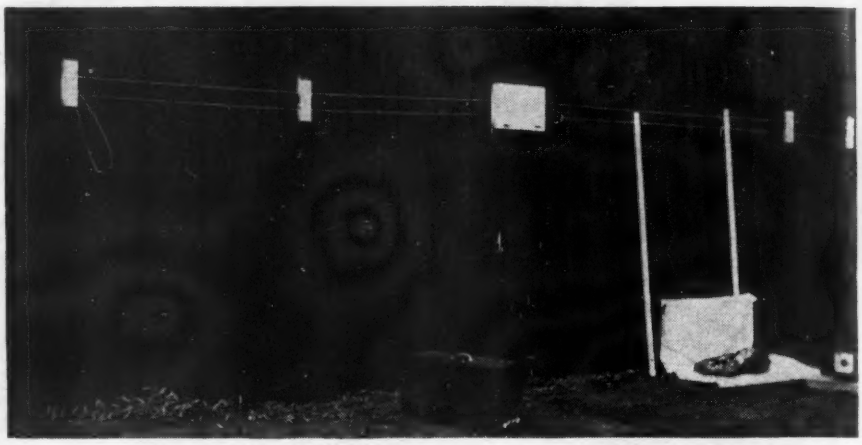
Study of the line drawing shows the path by which current can flow through the coal, pipes and blasting lines. The connections to the coal are shown in one of the photographic illustrations. Connecting the wires in the contactor box to the power supply, the pushbutton is operated and the blasting lines are energized. However, the short circuit in the blasting lines prevents the detonator from firing, while the current is still on the blasting lines, the short circuit is removed by cutting the lines at that point, using the wire cutters with insulated handles. The detonator fires instantly.

This step in the demonstration shows convincingly the conductivity of anthracite and the value of short-circuiting the blasting lines to prevent premature explosions.

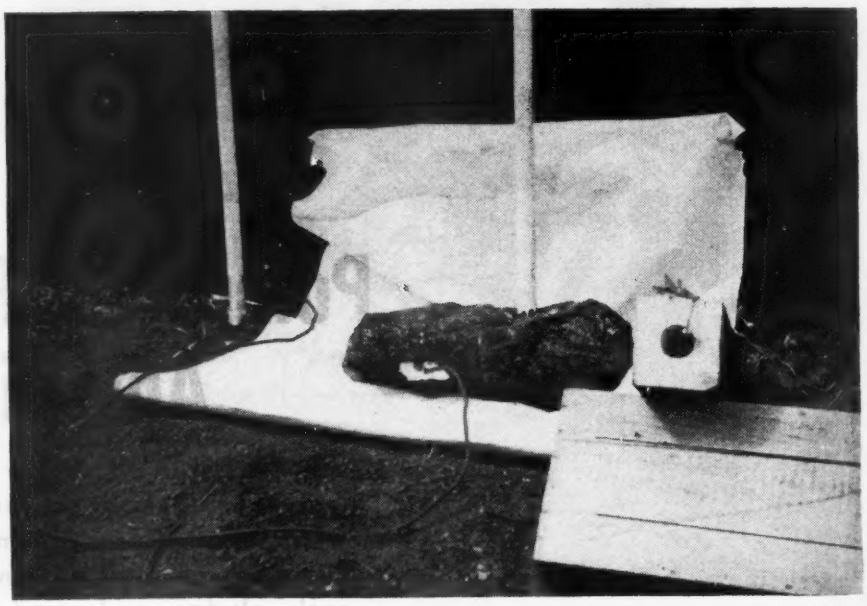
Continuing the demonstration to further prove the value of short-circuiting, the blasting lines again are shorted and a new detonator is carefully placed in the wood block and connected. The blasting unit is then attached to the blasting lines near the detonator, as shown in an accompanying illustration. Power is applied, but the detonator fails to fire. The short circuit is removed, power again is applied from the blasting unit and the detonator fires instantly.

Workmen are much impressed by the demonstrations, which show them how to connect detonators to the blasting lines and also prove that with the blasting lines short-circuited the detonator connected thereto cannot be set off by ordinary stray electrical currents.

Grateful acknowledgment is made to the officials of the Lehigh Valley Coal Co. and especially Osborn Morgan for furnishing data and for the many courtesies rendered during the colliery inspections.



Blasting lines, contact box, two 1-in. pipes and detonator in hole in block of wood ready for demonstration.



Power lines attached to the 1-in. pipe and coal. Current passes through coal into pipe and is carried to the blasting lines. View also shows wooden detonator block.

Demonstrating that the detonator will not fire when the blasting lines are short-circuited. When the short circuit is removed, however, the detonator fires instantly.

More POWER HOURS for the Mines

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For years Heavy-Media Separation has been helping the steel industry to produce a higher grade of iron ore. Heavy-Media Separation can also produce a more uniform and higher grade of metallurgical coal from which better coke can be made. From these two higher grade and more uniform raw materials, a greater output of higher quality iron will result . . . with lower coke and stone consumption.

To help the coal industry achieve greater efficiency by improved surface coal preparation with Heavy-Media Separation is Cyanamid's long-term goal. To this end, Cyanamid Research and Technical Services are freely available in the economic application of Heavy-Media Separation.

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- Headpiece molded of strong bakelite, sealed, moisture-proof and dust-proof.
- Rubber battery case—non-conductor of electricity—a valuable safety feature.
- Battery solution (free) limited to one ounce total both cells.
- Lead-acid type battery maintains high voltage throughout shift (80+ percent efficiency)—year after year.
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- Designed for self-service charging system for lowest lamp-house operating cost.
- To charge, headpiece is simply slipped on to key in charging rack, and turned to make contact. Nothing to take apart—unit-sealed construction.

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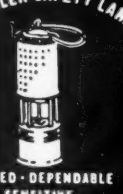

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Sign Labels and Directs

A SIGN with the familiar arrow designation may lead some one to safety, should the time ever arrive, states Tom Peyton, mine foreman, North Diamond No. 2 mine, West Kentucky Coal Co., Earlington, Ky. The sign, displayed in the accompanying illustration, requires very little more work than the rectangular type if it is made a part of the original operation in the carpenter shop.

When approaching the sign from either direction, even a visitor would know in which direction to turn to head for the bottom. The old timers remember that generally "all switches lead to the bottom," but in a mine using a belt conveying system some other guide is necessary.

This sign, pointing the way as it does, relates Mr. Peyton, should serve as an excellent guide in times of confusion.

Looking at the sign pointing to 13 South: left to right, Will Cobb, chief electrician, and Tom Peyton, mine foreman.

Hoist Protected and Cars Sprayed

TWO PUSHBUTTON-CONTROLLED SWITCHES, one for limiting the movement of a trip at a loading station and the other to provide automatic spraying of the coal as the cars leave the loading station, have been developed for use in conveyor mining by Robert Messner, Montour No. 10 mine, Pittsburgh Coal Co., Library, Pa. The first is a safety stop switch on the Brown-Fayro hoist used for moving cars under the loading head in the conveyor section. The purpose is to prevent the trip from being pulled into the hoist.

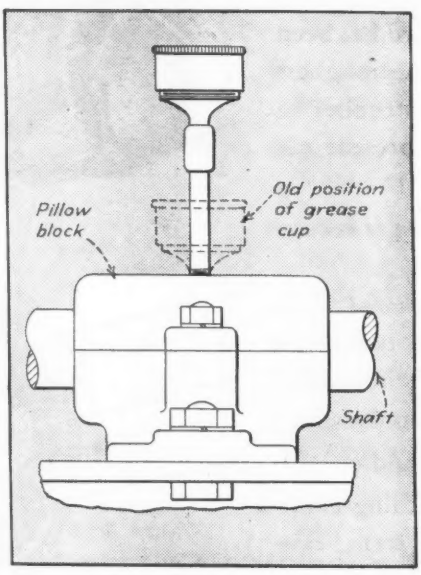
The idea involves a pushbutton set off to the side of the coal trip about one car length from the hoist. A flexible arm made of rubber belting is attached to the pushbutton. It is positioned so that when the car comes in contact with it, it operates the pushbutton, which in turn stops the hoist motor. The loading-head operator is unable to start the hoist motor until the trip has been moved away from the switch. "This device is invaluable because it reduces the maintenance cost on the hoist and saves costly production delays."

The second idea is an automatic spraying device for wetting cars when leaving the loading head on a conveyor section. This device is an improvement on the original device in that it has eliminated depending on the loading-head man to operate the water spray. The sprays are operated from a pushbutton set-up similar to that used in the car stop. The flexible arm made of rubber belting projects from the loading head and when in contact with the car closes the circuit starting the spray motor which sprays the cars as they move under the loading head. Although it does not actually save time or money, it is stated, it does insure spraying of the cars.

Grease Cup in Safer Location

MOVING THE POSITION of the ordinary grease-cup fitting to a handier location, writes Charles W. Watkins, Kingston, Pa., can alleviate the hazardous job of tending grease cups near rotating shafts. When grease cups are screwed directly into the pillow-block housing, the attendant necessarily works at very close range when making any adjustment of the grease cup. After cups wear slick from use, the attendant resorts to using a handful of waste to be able to grip and screw down the cup—and dangling waste and open cuffs of sleeves have no business near revolving shafts.

To eliminate this danger, Mr. Watkins suggests using a pipe nipple and coupling to move the grease cup out to a new and safer position.



Grease cup moved to a safer location by use of pipe fittings.

Better Ways

Have you ever read some particular Operating Idea and then said to yourself, "We are doing that a better way"? If you have—then won't you send in the solution? No one wants to use the old method when there's a better way. A simple description together with a sketch or photograph is all you need send on a new electrical, mechanical, operating or safety idea. For each acceptable idea Coal Age will pay $5 or more on publication.

Guides Oiled Automatically

LUBRICATORS for automatically oiling the cage guides have been assembled and installed by William McClure, Henderson mine, Pittsburgh Coal Co., Hendersonville, Pa.

Three 12x12x6-in.-deep sheet-steel tanks with covers were installed in an accessible location near the ground landing of the shaft, one on each outside guide and the other between the two center guides. The guides were drilled on an angle of 45 deg. and connections were made to the tanks with pipes and rubber hoses. In each line a globe valve was installed for regulating the flow of oil to the guides. It has been necessary in service to fill the tanks every third day.

"Proper lubrication of cage guides," it is stated, "will tend to relieve the frictional loads on the hoisting motor and extend the life of the cage guides."

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Fan Change-Over Time Cut 80 Percent

ORGANIZED PROCEDURE, equipment and tools kept in the fan house make it possible to complete the change from electric to the emergency steam drive for the fan at Grassy Island No. 4 colliery in 45 minutes, declared Gus Ollendike, maintenance foreman, Olyphant and Eddy Creek collieries, Hudson Coal Co., Olyphant, Pa.

The fan, a 20x7-ft. multi-disk double-inlet Jeffrey exhaust unit, is exhausting 225,000 c.f.m. at 3.2-in. w.g. When first installed, it was driven by an 18x30-in. Hoover-Owens corliss engine. Later, using the flywheel as a belt wheel, a 250-hp. 2,300-volt General Electric slip-ring motor with a Rockwood base was installed to drive the fan in place of the steam engine. However, the steam engine has been kept for standby service in the event of a failure of the electric motor.

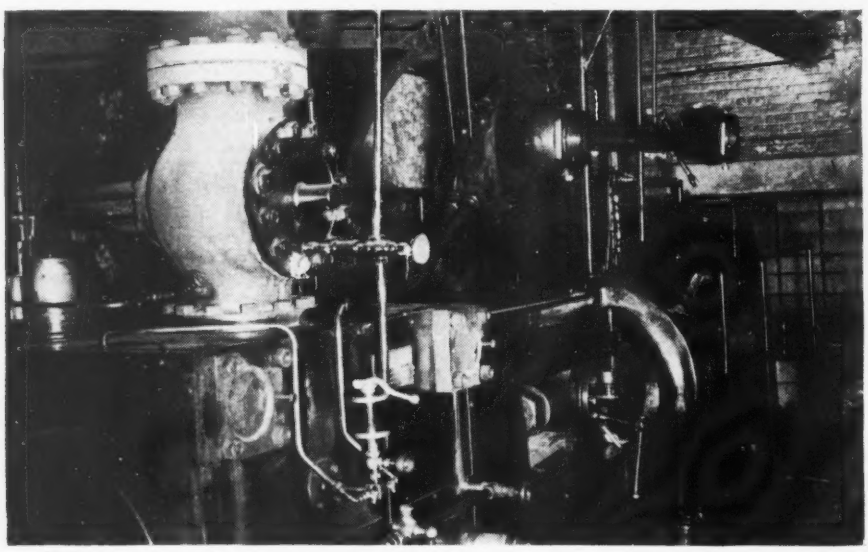
By means of the various devices displayed in the accompanying illustrations, four men now change the fan to the standby drive in 45 minutes. Formerly, six men required 3½ to 4 hours to make this change. The complete operation has been broken down into 14 simple steps and a list of the steps is hung on the wall of the fan house for reference.

A "BB" hoist from an undercutter and equipped with a crank is used to raise the motor to get slack in the belt, then to clear the belt from the belt wheel and, finally, to lower the valve rods and connecting rod in place on the steam engine.

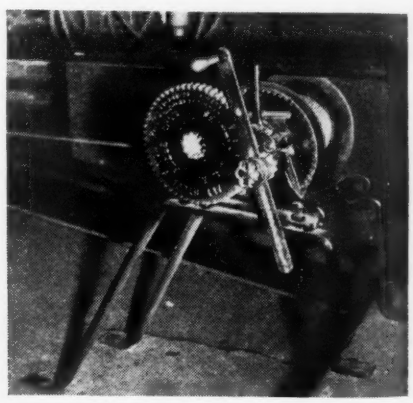
Two days after the equipment and tools were installed and the schedule worked out, the motor failed and this change-over procedure received its first real test. Since the fan ventilates gaseous workings, it is important when fan drive trouble occurs that the change be made as quickly as possible.

To Change Over Grassy Island No. 4 Fan From Electric to Steam

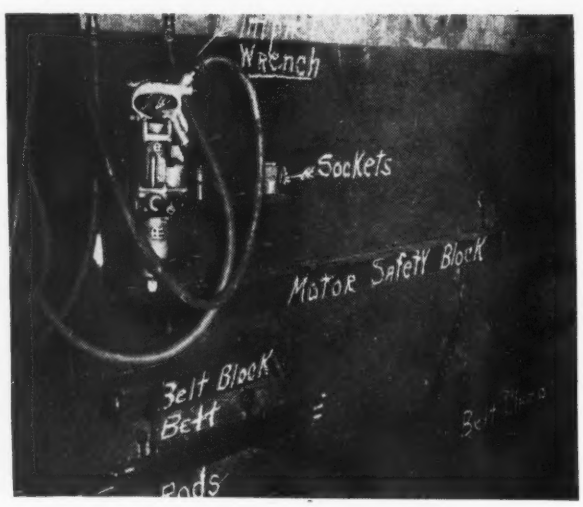
1. Put belt clamp on pull-side of belt opposite steam cylinder.
2. Wind up hoist and raise motor.
3. Insert motor block under motor at "X."
4. Use impact wrench to slack off take-up bolt under motor. Use handwheel to slack off take-up bolt under motor pulley.
5. Raise slack side of belt and put rods under same.
6. Insert belt block under belt at top of belt wheel.
7. Unhook rope from channel over motor and hook on belt clamp.
8. Wind up hoist. As the belt block raises belt from surface of the wheel insert rods under belt to hold belt free from wheel.
9. Stop crankpin below forward center.
10. Unhook rope from belt clamp. Put rope over pulley above valve rods. Hook on eyebolt on rod and connect up rods.
11. Unhook rope from valve rods. Put rope over pulley above connecting rod. Hook on eye and hook up connecting rod.
12. Tighten up valve covers.
13. Put on crankpin and eccentric oilers.
14. Start up fan. Check oil rings on fan bearings.



Steam engine, kept as standby for ventilating fan, can be put in service in 45 min.



A hoist from an old longwall undercutter is used to get the belt clear of the flywheel.

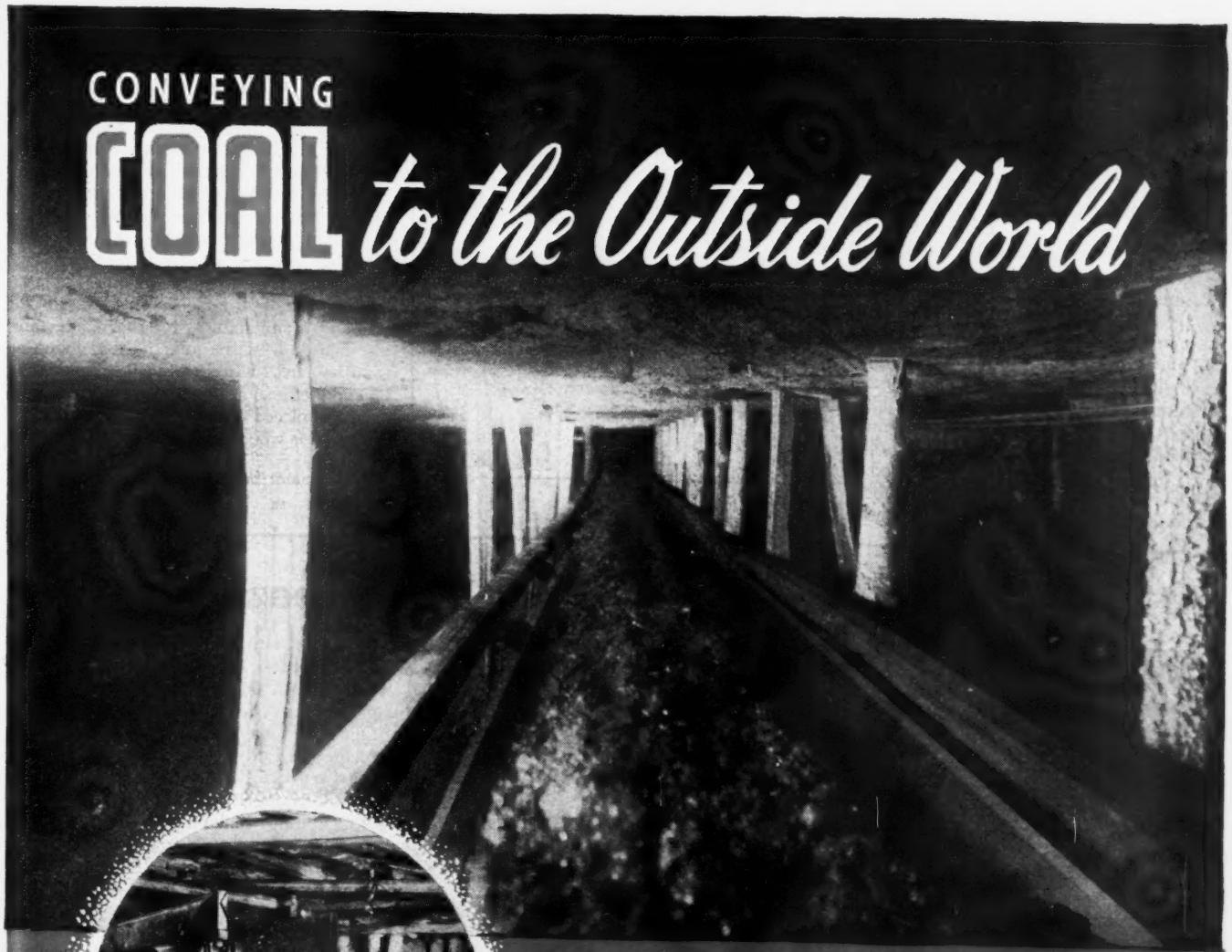


Tools for the change-over operation are racked and never taken from the fan house.

Gus Ollendike, maintenance foreman, checks the electrical devices.

CONVEYING

COAL to the Outside World



Underground coal conveyor belts are fighting against tremendous odds every hour of the day.

Here is a BWH conveyor belt in a large coal mine in Pennsylvania, operating as a "gathering conveyor" because it gathers the discharge from various room conveyors and carries the coal to the cars. This is severe service involving tandem drive, right angle feed, large pieces and uneven distribution of load. Yet notwithstanding these difficulties, this belt has met all conditions and has been operating many years.

Wherever extremely hard conveyor belt installations are contemplated, be sure to get in touch with our nearest distributor or field technician, or write us direct.

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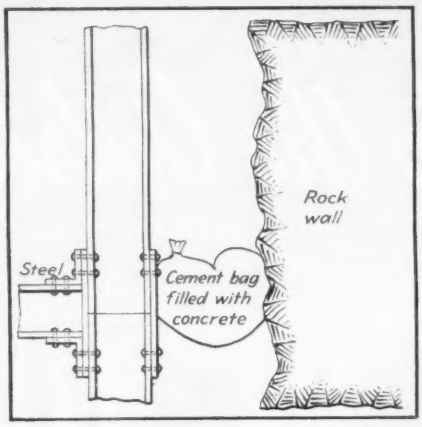
Blocking Steel Sets With Concrete

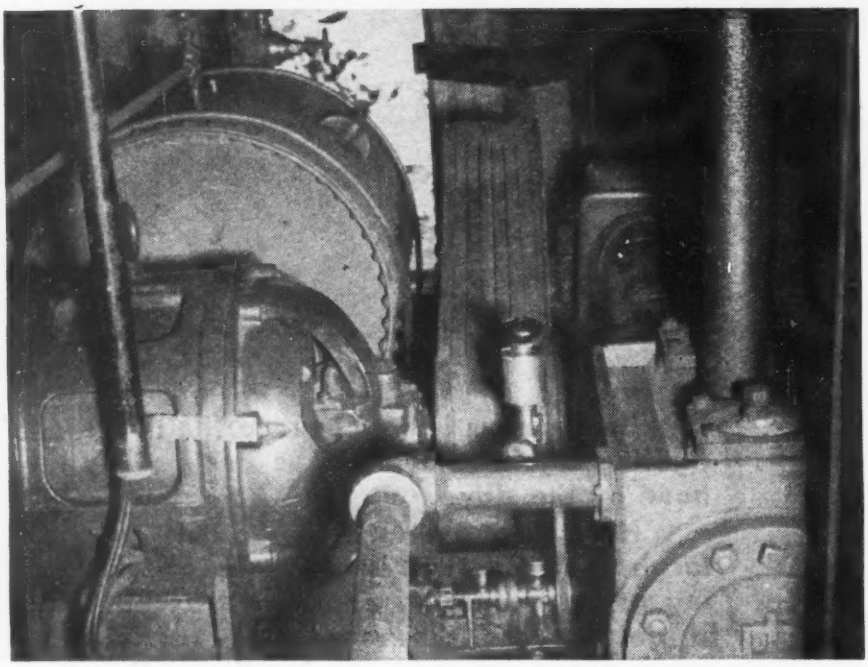
BLOCKING STEEL SETS in place in mine openings to keep them in alignment at all times can prove costly from the standpoints of both installation and replacement of wood blocking that has deteriorated in service, writes P. C. Ziemke, Oak Ridge, Tenn. Wood blocks, he states, must be cut with care for length and bevel to insure a good matching fit with the steel and the wooden wedges used to drive them solid. While moisture in the mine air will expand the wood fibers and thus tighten the blocks firmly, the same moisture will, in due time, also rot the blocking to the point where replacement must be made at considerable expense.

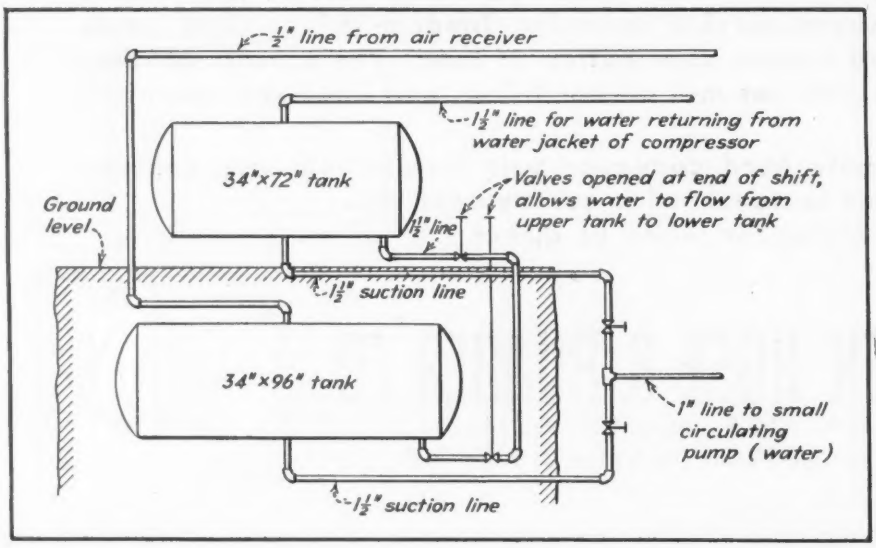
Substituting concrete for the wood is one obvious answer and this can be best accomplished, according to Mr. Ziemke, by filling old cement bags with lean concrete and wedging these between the steel and the rock with special attention to the corners. The soft material indents to conform with the contours of the rock and steel so that when the bag material rots away the block of concrete remains in place with bulldog tenacity for the life of the steel. While the expense of buying the bags rather than turning them back to the cement manufacturers for the rebate must be figured into the job, the net saving on timbermen's wages is very great," Mr. Ziemke concludes, "because the filled bags can be placed in one-fourth the time required for wood blocking and wedges."



How cement bag filled with concrete is used in blocking steel work.

Compressor's Water Kept From Freezing




½" line from air receiver
1½" line for water returning from water jacket of compressor
34"×72" tank
Valves opened at end of shift, allows water to flow from upper tank to lower tank
Ground level
1½" line
1½" suction line
34"×96" tank
1" line to small circulating pump (water)
1½" suction line

DRAINING THE WATER used for cooling an air compressor at an isolated rock-disposal station to a tank buried below frost level prevents its freezing overnight, says Gus Ollendike, maintenance foreman for Olyphant and Eddy Creek collieries, The Hudson Coal Co., Olyphant, Pa.

The piping layout and the small circulating pump, tied in with the main drive of the compressor, are shown in the accompanying illustrations. With all the water in the lower tank the compressor must be started without water in the cooling jacket. Shortly after starting the compressor, compressed air is made available and by properly controlling the valves air is made to enter the lower tank. This air forces the water from the lower to the upper tank, whence it is used while the compressor is in operation. As soon as water appears in the upper tank the small circulating pump, which is driven from the pulley of the compressor motor, begins to supply water to the cooling jacket of the compressor. When the jacket fills up, water overflows and is pumped back to the upper storage tank.

At the end of the shift the water of the entire system is drained back into the lower tank and the danger from freezing is avoided. "The lower tank," said Mr. Ollendike, "was purposely made larger to make sure it would accommodate all the water in the system."

Upper Left: Small pump, belted to compressor motor, assures positive circulation of cooling water.

Left: The lower tank, buried below frost level, is large enough to accommodate the water of the entire system.

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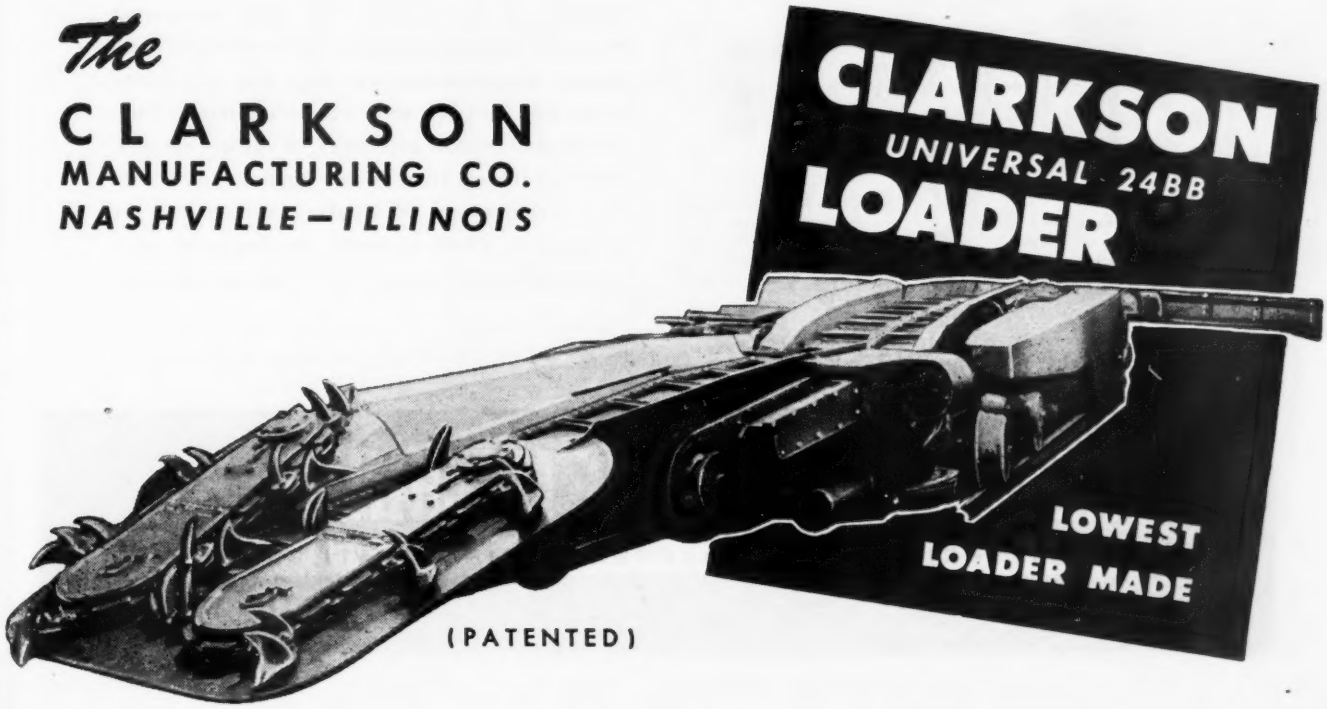

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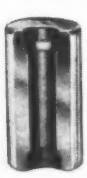
CINCINNATI DUPLEX CHAIN



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News Round-Up

10c Coal Royalty Demanded by Lewis; Files Notice of Wage Dispute

TAKING A LEAF from the book of James Caesar Petrillo, head of the Musicians' Union, John L. Lewis, United Mine Workers' president, put a royalty of 10c. per ton at the head of the list of demands handed the operators at the opening of negotiations for a new bituminous wage agreement in Washington March 1. While disclaiming any desire for a work stoppage, Lewis nevertheless set the stage for it a few days earlier (Feb. 26) by filing notice with the Department of Labor, National War Labor Board and NLRB that a wage dispute existed. In conformity with Sec. 8 of the Smith-Connally Labor Disputes Act, this requires NLRB to take a strike vote of the workers after 30 days. With the current contract expiring March 31, the notice was filed in time to cover the possibility of a strike April 1 should negotiations with the operators break down.

Citing that for the first time in history negotiations will be on a national scale, Lewis called "upon the operators and government to cease their hostile action and adopt a reasonable cooperative attitude conducive to obtaining a new contract and continuous and uninterrupted production of coal." In addition to the royalty, Lewis' demand also included unionization of all supervisors except the superintendent and one foreman at each mine, company purchase of explosives and safety equipment, increased vacation payments, elimination of district differentials and differentials within mechanical loading crews by raising lower rates to the maximum with corresponding adjustments of other rates and straight and overtime pay for all time spent underground, including lunch, in addition to other demands affecting both wage payments and managerial functions. The text of the demands follows:

1. Contract Termination.—The new national agreement to be negotiated by this joint conference shall be effective from April 1, 1945, and continue until either party, through representatives designated by the operators signatory to the agreement or the international union, United Mine Workers of America, may terminate the joint wage agreement by giving twenty (20) days' notice in writing, in advance of such cancellation.

2. Labor's Participating Royalty.—For each ton of coal mined, for use or sale, the producers thereof, by agreement, shall pay to the United Mine Workers of America in behalf of its members a participating royalty of ten (10) cents per ton.

Such royalty shall be deemed partial compensation in equity to the mine worker for the establishment and maintenance of his ready-to-serve status, so vital to the profit motive of the employer and so imperatively essential to public welfare.

Funds resultant from accrued royalties will be available to the union to provide for its members modern medical and surgical service, hospitalization, insurance, rehabilitation and economic protection.

3. Explosives and Accessories.—All explosives, cables, detonators, batteries, fuses and other accessories used in blasting shall be furnished by the employers without charge to the mine workers.

4. Exemptions.—The term "mine worker" as used in the basic agreement and all district agreements shall include all persons employed inside or outside of the mines, except the superintendent and one mine foreman.

5. Differentials.—Existing inequitable differentials within and between districts shall be eliminated, including cutting and loading rates. The helper classifications shall be eliminated from the agreement.

The principle embodied in the Appalachian and Southern wage agreements of 1941-43, regarding rejects in the preparation and cleaning of coal, shall apply to all districts.

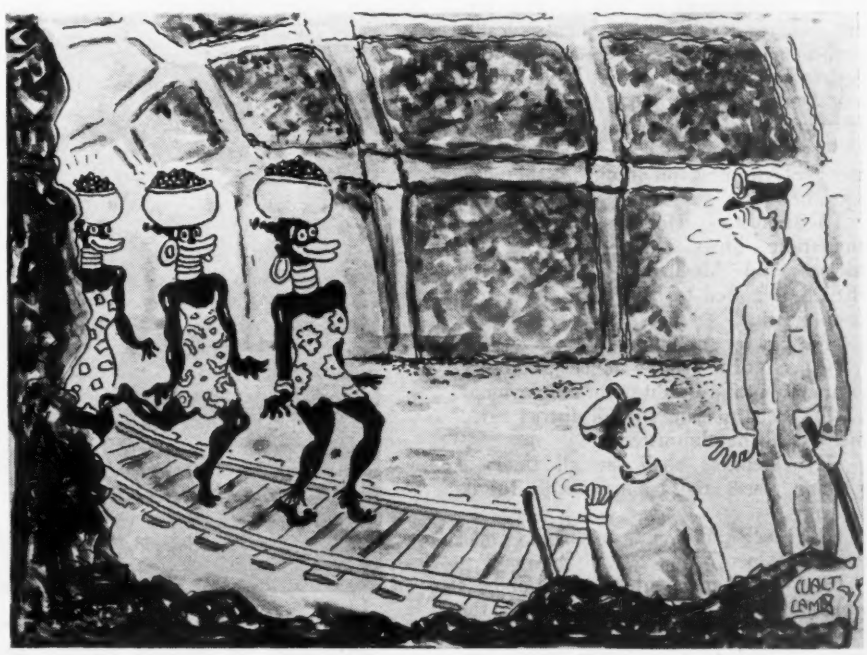
6. Shifts.—Differential pay for second shift, 10 cents per hour; third shift, 15 cents per hour.

7. Vacation Payment.—The vacation payment provision of the agreement shall be amended by substituting one hundred dollars ($100) in lieu of fifty dollars ($50).

Pro-rata payments shall be provided for those mine workers who are given employment during the qualifying period and those who leave their employment and are not on the payroll for the full qualifying period.

8. Veterans.—Agreement to aid returning war veterans in securing employment as provided by law, protecting their seniority rights, and dealing with problems relating to re-employment.

9. Union-Made Tools and Explosives.—A provision requiring employers to furnish union-made tools and explosives shall be inserted.



"All this is—lend-lease and carry"

10. Housing.—Substandard housing conditions and debased sanitary facilities now in existence in many mining communities shall be improved by joint action of the contracting parties. Wash-house facilities shall be established at all mines without charge.

11. Hours of Employment.—The supplemental wage agreement, dated Dec. 17, 1943, carried forward and preserved the terms and conditions contained in all joint wage agreements, effective April 1, 1941, to March 31, 1943, and also the supplemental agreement providing for the six-day work week, as amended and supplemented by the memorandum of agreement dated Nov. 3, 1943.

Therefore, the present nine-hour portal-to-portal arrangement, expiring March 31, 1945, shall be modified so that all time underground, including fifteen minutes of lunch time, shall be computed upon the seven-hour day, thirty-five hour week provisions of the agreement effective April 1, 1941, to March 31, 1943, with time and one-half, and rate and one-half for all overtime in excess of seven hours per day and thirty-five hours per week.

12. Unit Work.—(A) Mobile operators' rate shall apply to all men in the unit.

(B) Conveyor operators' rate shall apply to all men in the unit.

13. Outside Day Men Including Employes in Strip Mining.—The earnings and rate relationship of outside day men shall be maintained.

14. Safety Equipment.—Hats, caps, goggles, special shoes and rubber boots shall be furnished by the employers without charge to the mine workers.

15. Settlement of Disputes.—Agreements now in effect that preclude the right of management and district officials of the United Mine Workers of America to intervene in the settlement of a dispute, arising under the terms of the agreement, shall be amended to permit such joint effort before reference to higher tribunals.

16. Management of Mines.—The present basic and district agreements, dealing with management of mines, shall be modified to permit an aggrieved mine worker, who is transferred from a day wage classification to face or tonnage work, the right of appeal, as provided for by the settlement of disputes provision of the wage agreements.

17. Inpurities, Holidays, Physical Examinations, Fines, Laying a Track, Electricians and Mechanics.—(A) Operators shall be required to pay for all slate, rock or impurities.

(B) Pay for six holidays.

(C) No man shall be subject to physical examination as a condition of employment.

(D) Penalty clauses in all district agreements shall be eliminated.

(E) Operators shall lay all track in working places and be responsible for its recovery.

(F) Electricians and mechanics shall receive $9 per 7-hour day.

18. Wage Agreement.—It will not be a violation of the wage agreement for the mine workers to cease work to prevent shipment of coal to a consumer whose employes are engaged in a legal strike.

Bill Introduced For TVA Counterparts

A bill (H. R. 1824) labeled "to provide for the creation of conservation authorities" has been introduced in the House of Representatives at Washington by Representative Rankin (D., Miss.) and is designed to blanket the nation with eight additional TVA's. The projected ones are Atlantic Seaboard, Great Lakes-Ohio Valley, Missouri Valley, Arkansas Valley, Southwestern, Columbia Valley, California, and Colorado Valley Authority.

Senator Murray of Montana reintroduced in the Senate in mid-February his bill to create a Missouri Valley Authority and empower it to construct $400,000,000 worth of flood-control projects authorized in the flood control bill of the 78th Congress. The measure was referred to the Committee on Commerce, but this action was immediately protested by Senator Murray, who entered a motion to transfer it to the Committee on Agriculture. He stated that his bill would stand no chance of ultimate adoption if left in charge of the Commerce Committee and that he would use every effort to have it handled, as was TVA, under the Agriculture Committee.

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Testimonial Presented To C. J. Potter

A luncheon was given for Dr. Charles J. Potter, Deputy Solid Fuels Administrator, Feb. 14, following the regular monthly meeting of the Solid Fuels Advisory War Council in Washington. The climax of the occasion was the presentation of a scroll expressing the esteem of the Advisory Council for Dr. Potter, as follows:

"In appreciation—a testimonial to Charles Jackson Potter, Deputy Solid Fuels Administrator for War for World War II, in appreciation of his extraordinary contribution to those engaged in the production, distribution and transportation of coal—to consumers of coal—to his country during a time of crisis—this scroll is inscribed. It bears with it the hearty commendation, deep admiration and warm affection of the members of the Advisory Council of the Solid Fuels Administration for War, representing the solid fuels interests of the United States of America.

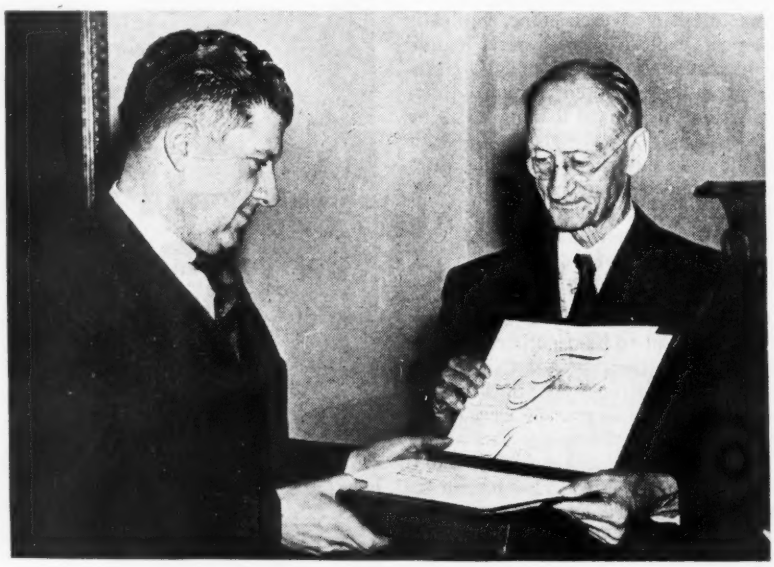
"In witness whereof the members of the Advisory Council of the Solid Fuels Administration for War have hereunto affixed their signatures this fourteenth day of February in the Year of our Lord One Thousand Nine Hundred and Forty-Five.—Henry T. DeBardeleben, O. L. Alexander, Charles O'Neill, Thomas Kennedy, Percy Tetlow, Warren C. Kendall, Walter Dill Scott, C. F. Huber, James H. Pierce, George W. Reed, Richard L. Bowditch, J. A. Maher, J. L. Newbold, Lachlan Macleay, H. C. Roger, Frank C. Lathrop."

•

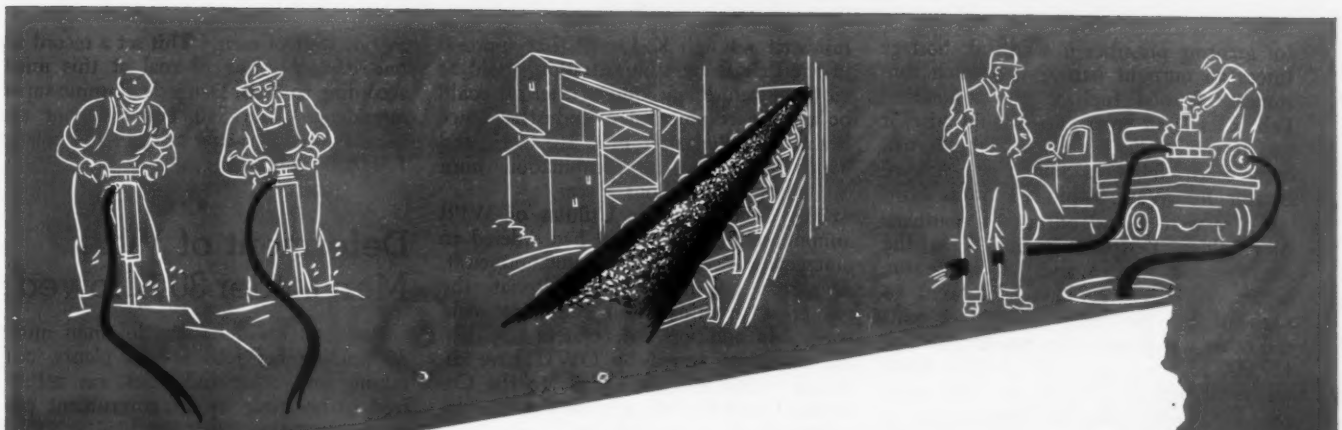
Further Steps Taken To Save Coal

As a further aid in the saving of fuel, James F. Byrnes, Director of War Mobilization and Reconversion, ordered all places of entertainment, from fancy night clubs to roadside "juke joints," to close at midnight beginning Feb. 26. Though officially issued as a "request," the nationwide order was made mandatory through the powers of the War Manpower Commission, the Office of Price Administration, the War Production Board and the Office of Defense Transportation. Restaurants that serve food exclusively may remain open, and other restaurants may stay open by closing bars and stopping sale of liquor and beer at midnight.

At the request of Secretary Harold C. Ickes, the War Production Board has prepared a list of users of coal in terms of their essentiality for application as a guide



Deputy Administrator Potter receives scroll in recognition of his "extraordinary contribution" in handling wartime fuel problems from Dr. Walter Dill Scott, chairman, Solid Fuels Advisory War Council.



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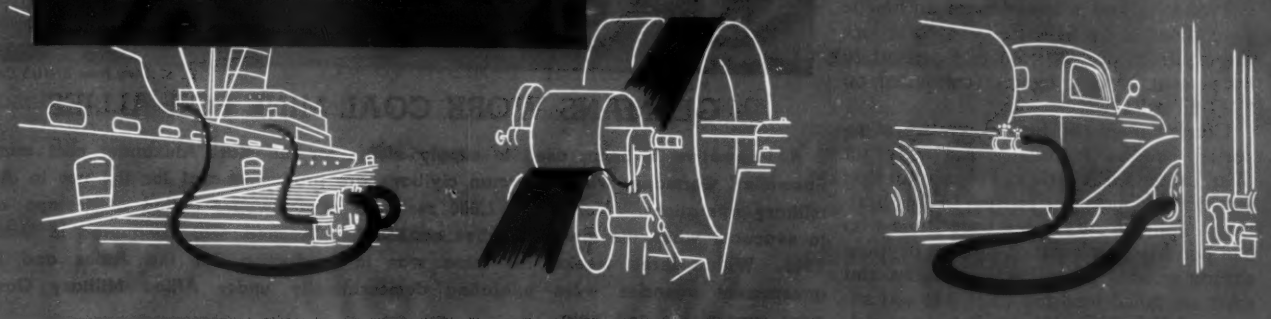

for granting priorities if a critical shortage forces an outright ban against some consumers of solid fuel, it was announced Feb. 22. If an emergency should arise, it was revealed, the listing could be turned over to Mr. Ickes, as Solid Fuels Administrator for War, within 24 hours.

There were record outputs in southern Appalachian Districts 7 and 8 in the weeks ended Feb. 4 and 18, where the miners worked seven days each week to augment the fuel supply for steel mills and other war plants. On Sunday, Feb. 4, 427,000 tons was produced in these areas, compared with a 630,000 ton daily average. Big Sandy broke its all-time record in the week ended Jan. 27. Output in the Winding Gulf and Pocahontas fields in the week ended Feb. 4 increased 1.9 and 6.1 percent, respectively. River captive coal mines of 19 steel companies in western Pennsylvania also worked two Sundays, Feb. 25 and March 11, to relieve the coal situation there.

Producers in the southern Appalachian area were permitted temporarily to increase their ceiling prices 5 to 15c. a ton to help pay for extra costs of Sunday operation in February, the Office of Price Administration announced Feb. 3.

SFA gave notice Feb. 7 that, beginning April 1, it would prohibit moving of eastern-mined bituminous coal by Great Lakes vessels for use as railroad locomotive fuel and that steps would be taken to determine which industrial consumers supplied by lake can convert to the use of midwestern-mined coals.

SFA has prohibited coal deliveries for heating purposes by retail dealers in Wisconsin and the Upper Peninsula of Michigan to consumers who have more than two weeks' supply.

Solid Fuels Administrator Harold L. Ickes announced Feb. 13 that action has been taken to prevent coal shippers from evading, by imposing excessive financial burdens upon purchasers, government directions to make emergency shipments. He said he had amended the regulation governing directed diversions of coal by requiring that "reasonable" financial arrangements be made between the supplier and recipient.

About 65,000 anthracite miners who reported for work Saturday, Feb. 3, although most of them were paid only straight time instead of time and a half, drew praise from the government. For many made idle by the freight embargo it made Saturday the fifth instead of the sixth day of work. Owen E. Williams, SFA representative, said that output for the day was about 150,000 tons.

Producers and wholesalers of anthracite were directed by SFA Feb. 14 to reduce shipments to dealers from 82½ percent to 80 percent of base figures (computed on 1942-43 sales).

Conditions in the fuel-oil market, as reported by the Petroleum Authority for War, caused OPA early in February to stop accepting applications for fuel oil for heating equipment. Excepted were those who had purchased or installed burners or those already granted oil rationing coupons and what are called hardship cases. It was announced Feb. 22 by Deputy Petroleum Administrator Ralph K. Davies that approval of the Petroleum Administration would be required before any kind of fuel oil could be used in commercial or industrial space heaters installed after Feb. 26, 1945, and which singly or in combination burn 10,000 or more gallons a year.

The Office of War Utilities of WPB announced Feb. 19 that it had ordered an emergency diversion of 20,000,000 cu.ft. of natural gas into Ohio to alleviate the gas crisis resulting from the latest cold wave. In addition, inter-system dispatching directives issued by OWU have diverted 15,000,000 cu.ft. daily to the Columbia Gas & Electric system, which serves central Ohio, the area of most acute shortage, from other systems in the Appalachian area.

OWU reported Feb. 21 that it had ordered industrial plants in the Appalachian area that use gas and have standby facilities using residual fuel oil to use those facilities to capacity for the next month. The action was in the form of General Directive 2 issued under Utilities Order U-7 and was another step designed to alleviate critical natural and mixed gas shortage conditions brought about by abnormally cold weather throughout the area. The area includes Virginia, West Virginia, Maryland, Ohio, Pennsylvania, New York and the District of Columbia.

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Majestic Sets Record

At the Majestic mine of the Peabody Coal Co., DuQuoin, Ill., on Feb. 6 5,025 tons of coal was brought to the surface by one shift of men. This set a record for one day's hoisting of coal at this mine, according to E. B. Dangerfield, mine superintendent. The 550 employees of the mine worked 306 days in 1944 and hoisted 1,500,000 tons of coal.

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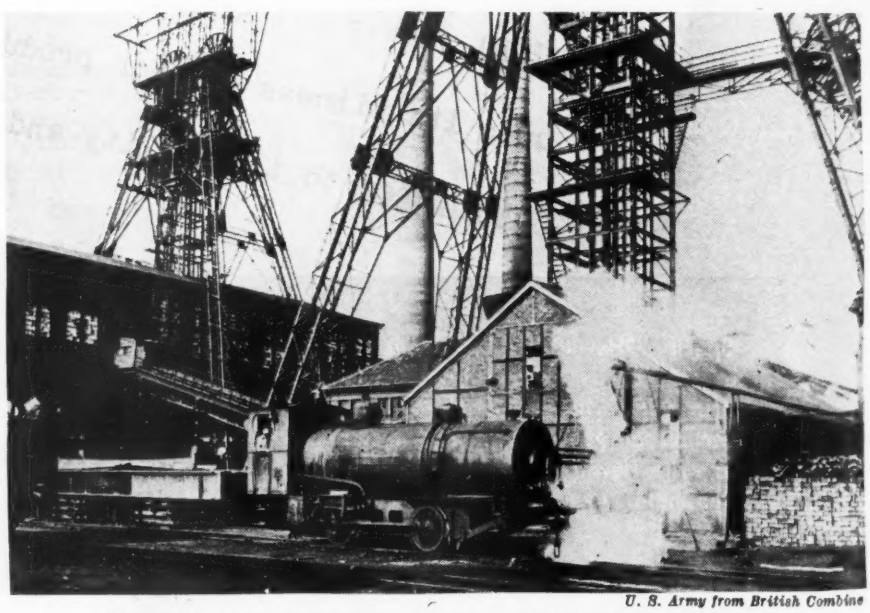
Deferment of Vital Men Under 30 Allowed

Requests for deferment of men under 30 holding key jobs in war plants, coal mining and other industries was authorized to be made by 15 government procurement agencies under a plan approved Feb. 17 by James F. Byrnes, Director of War Mobilization and Reconversion. All of the agencies are responsible for procurement and production of war goods and for maintenance of essential services, among them being the Solid Fuels Administration for War.

This and other important revisions, announced to take effect April 1, in existing policies relating to draft deferments, on occupational grounds, of men under 30 will result in cancelling a large proportion of present occupational deferments in the under 30 age groups. The impact upon the coal mines of this rescreening of all present occupational deferments of men under 30 and the prospective drafting, in the case of the mines, of seven out of every ten men in this group will be severe and certain to reduce the mine output of coal desperately needed to maintain war production and transporation at maximum effectiveness, it is pointed out by the National Coal Association.



U. S. Army from British Combine

GERMANS WORK COAL MINE FOR ALLIES

A locomotive is being used to supply steam for the Karl Alexander coal mine in Basweiler, Germany, where German civilians are producing coal for the use in Allied military operations. More than 1,000 residents of Basweiler defied a Gestapo order to evacuate when the town, 12 miles northeast of Aachen, was conquered in October, 1944. Within three weeks, the mine was in production for the Allies and local government agencies were operating democratically under Allied Military Government supervision and veto.

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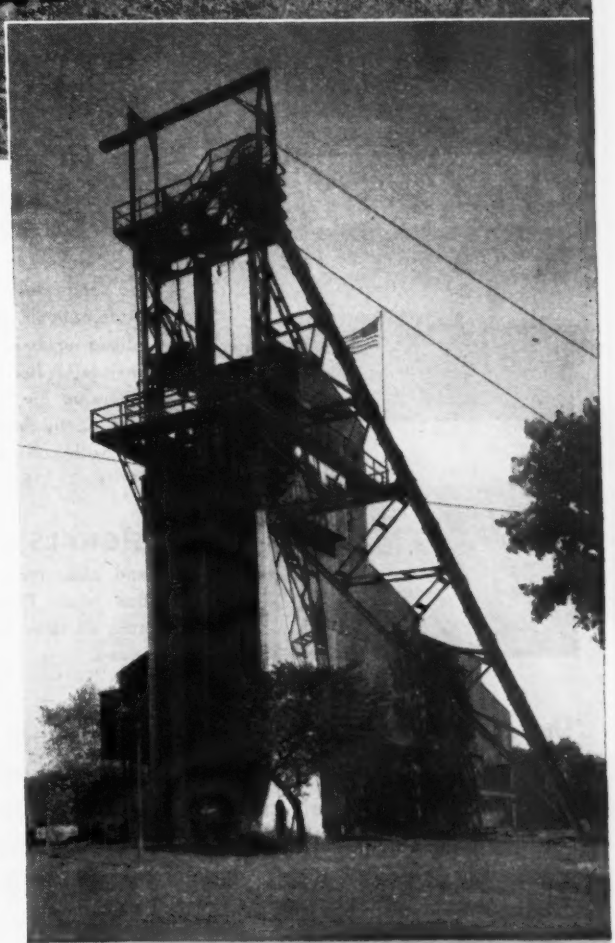
after 19 years of faithful service



The Dresser Coal Mine of the Walter Bledsoe and Company, Terre Haute, Indiana, recently initiated a retirement program to *honorably discharge* 243 "Timken Bearing Equipped" mine cars which had been in constant operation for almost 19 years. Yet, even after these years of hard service practically all of the original Timken Bearings are still in excellent condition.

These oldtimers which were designed and built by American Car and Foundry Co., Huntington, W. Va., performed so efficiently 225 new "Timken Bearing Equipped" cars were manufactured by them recently for the Dresser Mine.

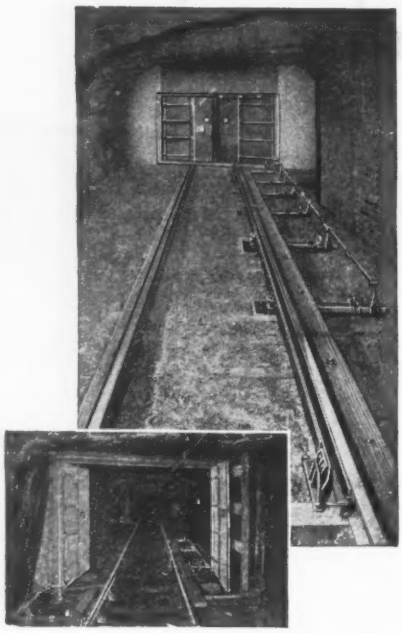
Mine operators everywhere today enjoy the advantages of faster train speeds, greater tonnage hauls, lower power consumption, simple and economical lubrication and greatly reduced maintenance because their cars roll on Timken Bearings. If you are not yet one of these satisfied operators it will pay you to investigate the advantages of Timken Bearings without delay. The Timken Roller Bearing Company, Canton 6, Ohio.

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS

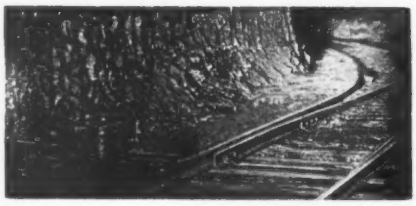
SAVES LIVES, TIME and MONEY
Speed the Haulage Safely with



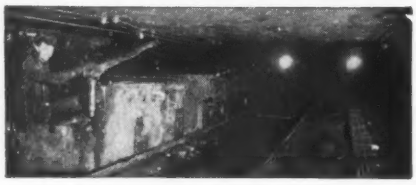
ECONOMICAL
AUTOMATIC
DEVICES . . .

Reduce Costs,
Increase Tonnage!

THE AMERICAN AUTOMATIC DOOR . . . requires no attendant—opens automatically in a split second and closes same way when last car has passed—no slowing down on approach—thus trips are speeded up. Mechanical action is fast and positive. Air flow is maintained at constant speed to carry off accumulated gas.



THE CANTON AUTOMATIC SWITCH THROWER . . . does everything a switchman can do and does it faster with safety. Automatically throws switch points ahead or behind trip—or both. Trip maintains full speed. Switch can be operated by motorman, remote control or by hand and is adapted for use with automatic DERAILER.



SIGNALS . . . warn interfering trips and clear the way for non-stop main line trips. Prevent collisions and enable all trips to move with safety and speed.

These automatic devices make for perfect coordination of loading, transportation and tipple by eliminating lost time and speeding trips efficiently and safely. Our sales engineers will be glad to inspect and recommend installations that will save man hours, improve *safety*—no obligations. Canton devices pay for themselves—quickly. Complete catalogues on request.

AMERICAN MINE DOOR CO.

2057 DEUBER AVE., CANTON 6, OHIO

Steps to be taken by mine management in this situation are outlined in a telegram sent out Feb. 19 over the signature of Dan H. Wheeler, to managers of SFAW field offices throughout the country. The telegram says, in part:

"No man can be certified for deferment unless he is doing work indispensable in an activity included on WMC list of essential activities; that no such man can be certified for deferment if he can be replaced from less essential work at the mine or by recruitment from without. The plan provides for certification for deferment of approximately 30 percent of all registrants under 30 years of age who were occupationally deferred in Class 2-A or 2-B on Jan. 1, 1945.

"Each employer shall furnish to his appropriate certifying officer: (1) A list in triplicate of all his present employees under 30 years who were on Jan. 1, 1945, classified as 2-A or 2-B (excluding those known to be classified as 4-F, 2-A (F), 2-A (L), 2-B (F), 2-B (L). This list of men shall be arranged in order of importance to the mine, the most essential irreplaceable men coming first on the list. One copy of the list will be forwarded to

COAL ACTIVITY

Bituminous Coal Stocks

	Thousands Net Tons Jan. 1 1945	P.c. Change From Dec. 1 1944	P.c. Change From Jan. 1 1944
Electric power utilities	16,305	−7.7	+10.6
Byproduct coke ovens	6,301	−9.4	−3.2
Steel and rolling mills	700	−10.6	−0.7
Railroads (Class I)	12,917	−10.5	+36.0
Other industrials*	16,434	−12.2	−18.2
Total	52,459	−10.1	+2.1

Bituminous Coal Consumption

	Thousands Net Tons Dec. 1944	P.c. Change From Nov. 1944	P.c. Change From Dec. 1943
Electric power utilities	7,062	+3.5	− 5.7
Byproduct coke ovens	7,985	+3.1	+1.5
Steel and rolling mills	1,022	+12.6	+2.1
Railroads (Class I)	11,787	+10.0	−1.0
Other industrials*	13,985	+4.7	−10.3
Total	41,841	+5.5	−4.6

* Includes beehive coke ovens, manufactured-gas plants and cement plants.

Bituminous Production

January, 1945, net tons	52,200,000
P.c. change from January, 1944	−3.3

Anthracite Production

January, 1945, net tons	4,241,000
P.c. change from January, 1944	−17.6

Sales, Domestic Stokers Vs. Oil Burners

	Stokers	Burners
December, 1944	4,849	3,919
P.c. change from Dec., 1943	+108.3	+43.7
January-December, 1944	38,576	34,437
P.c. change from Jan.-Dec., 1943	+42.8	+85.9

Index of Business Activity*

Week ended Feb. 24	232.1
Month earlier	229.4
Year earlier	238.3

* *Business Week*, March 3.

Electric Power Output†

Week ended Feb. 24	4,473,962,000
P.c. change from month earlier	−2.2
P.c. change from year earlier	+0.7

† Edison Electric Institute.

SIMPLEX-ANHYDREX UNDERGROUND CABLES

NEED NO PROTECTION FROM *Moisture*

Underground cables for electrical distribution are exposed to moisture which can cause a lot of trouble and seriously interfere with service. Metallic sheaths will keep moisture out of the cables but they often create other problems of electrolysis, corrosion, sheath losses and maintenance. A flexible, non-metallic covering, such as a rubber sheath, that will not absorb water is the ideal protection.

Simplex-ANHYDREX Underground cables are now made with synthetic insulations and sheaths that are suitable for underground service in ducts or directly in the ground. Exposure to moisture, even permanent submersion in water, has no effect upon their electrical stability. For steady, uniform underground distribution Simplex-ANHYDREX Underground cables are what you need.

Our experience with low water absorption insulations over many years is at your service whenever moisture creates a cable problem for you.

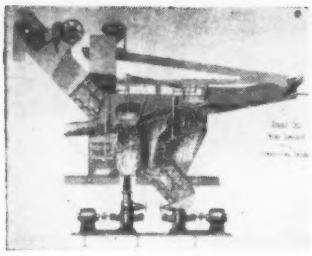
Buna S has replaced natural rubber in Simplex insulations.

Simplex Wire & Cable Co., 79 Sidney Street, Cambridge 39, Mass.

Simplex

WIRES and CABLES

PRODUCE *Better Coal* AT LOWER COST . . . WITH R and S MODERN EQUIPMENT

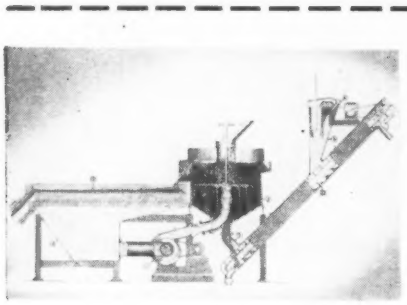


For all coarse coal washing

✔ HYDRO-SEPARATOR

IMPROVED LAUNDER TYPE

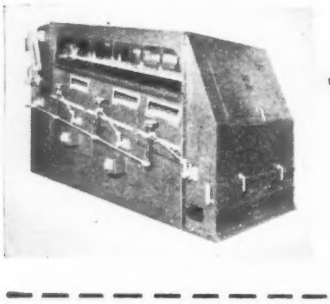
A product of painstaking engineering and long, intimate knowledge of production problems, the Hydro-Separator is known wherever coal is mined, as an exceptionally well built, efficient unit.



For low cost washing of fine coal . . .

✔ The HYDROTATOR

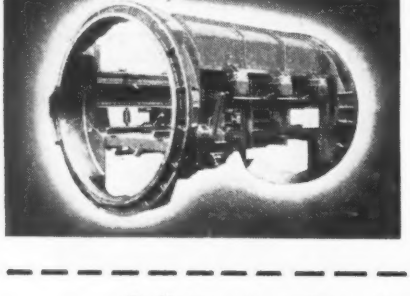
This is the effective way to wash fine coal and get increased recovery of marketable coal from sludge and refuse. Low cost efficiency is built into the Hydrotator.



For dry cleaning fine coal

✔ STUMP AIR-FLOW

Experienced operators *know* Stump Air-Flow—know it for its simplicity and dependability, for its sturdy construction. It cleans, dries, dedusts in one operation.



Handles any size and type of car

✔ ROTARY CAR DUMPER

Faster dumping, easy handling, unique safety features, reduced labor cost and minimum degradation—these advantages make the R and S Car Dumper the outstanding leader, Electric and Pneumatic types.

Bulletins describing these well designed, dependable units are modern "must" literature. Sending for them is a wise step—no obligation, of course. Simply refer to the product name.

R AND S COMPANY

ROBERTS and SCHAEFER CO.

307 North Michigan Avenue, Chicago

P. O. Box 865
PITTSBURGH, PA.

P. O. Box 570
HUNTINGTON, W. VA.

MEETINGS

- **Drumheller Coal Operators' Association: annual meeting, March 31, Drumheller, Alberta, Canada.**
- **Anthracite Conference, scheduled for May 3 and 4, Lehigh University, South Bethlehem, Pa., has been postponed.**
- **American Mining Congress: Coal Mine War Conference, scheduled for the week of May 14 at Cincinnati, Ohio, has been cancelled.**
- **Big Sandy-Elkhorn Coal Operators' Association: annual meeting, June 3, Ashland, Ky.**

the State director, one copy will be retained by the certifying officer for checking against the 42-A (Special, revised) which will subsequently be filed by the producer. (2) New forms for all registrants 18 through 29 years who were on Jan. 1, 1945, classified 2-A or 2-B. This form will be designated as Form 42-A (Special, Revised). National Selective Service Headquarters states that two sets of three sheets must be filed for each registrant.

"The employer must file a form for each man who appears on the eligible list. In making up this list it is suggested that the employer group his employees in four categories: A—Covering skilled inside workers; B—Outside workers, skilled; C—Unskilled workers, 1—inside, 2—outside, D—miscellaneous. No certification will be made for a registrant whose name does not appear on the list. The certifying officer must sign the first two pages of the form, one certified copy going to the local board, one to the State director, the third sheet should be returned to the employer. . . .

"The responsibility for designating those who are to be deferred rests initially with the employer, but certifying officers must exercise final judgment in all cases, so that full consideration is given only to those factors which will maintain production of coal. Unessential jobs, clerical jobs and unimportant unskilled jobs must be eliminated. Due care must be exercised to eliminate relatives of employers who are not actually engaged in production. The certifications must be put where they will do the most good and each must count.

"Certification officers may vary the percentage of certification for any one mine, but in no case can the 30 percent be exceeded. No substitutions or additions will be allowed; the list must reflect a true picture of employment on Jan. 1, 1945, of men 18 through 29 years and the percentage allowance of deferments is based entirely on this fact. It is expected that the deferments granted under this new procedure be effective six months from April 1, 1945."

In response to requests as to the actual number of coal miners 22-25 years old heretofore certified for draft deferment on Form 42-A (Special) and the State-by-State division of such deferments, Dr.

AMERICA WANTS COMPETITION

Only American Initiative Can Preserve It in World Trade

AMERICANS generally agree upon what constitutes a desirable pattern of international economic relationships. We want an expanding world trade, with minimum recourse to government-imposed trade barriers and discriminatory trading arrangements, and offering ample scope for competitive private enterprise. Because they are necessary to such trade, we want also stability of exchange rates, and national currencies that are mutually convertible at least for the settlement of current accounts. We want, too, arrangements to facilitate long-term capital loans with security to the lender and advantage to the borrower.

Few other nations subscribe to these aims with enthusiastic conviction. Some reject them flatly as impractical under the conditions likely to prevail during the postwar period, or achievable only at prohibitive cost to their domestic economies.

Unless, therefore, we can formulate a practical and comprehensive program to carry out our aims, and convince other nations that we will take a sustained and responsible part in making it effective, the international trade of the world surely will be conducted under a system of exchange controls, bilateral agreements, cartel bargains, import quotas, and direct government purchasing arrangements that are the very antithesis of the competitive system that we favor.

To agree upon a concrete American **program,** and to convince other nations that it is to their advantage as well as ours to accept it, is a major task of economic statesmanship. It entails reversing a trend which has persisted since World War I, and which has been intensified during the depression years of the nineteen-thirties and by the exigencies of World War II.

Clearly, that is not a task to be assumed lightly. We can hope to be successful only if (1) we have a deep conviction that what we seek is fundamentally important to the American interest, and (2) if we will take pains to understand why other nations fear that such a program may jeopardize their interests, and then make whatever accommodations may be necessary to resolve their doubts.

An expansive foreign trade policy has been advocated so vigorously and repeatedly in America recently that The Economist (of London) comments wryly upon what it terms the ironic circumstance that "the acceptance of the principles of free trade by the more literate (American) public should come at a time when the doctrines in their simplest nineteenth-century form have been pretty generally emasculated in fact and repudiated in principle by the rest of the world".

☆ ☆ ☆

Why are we opposed to managed world trade, and for competitive world trade?

First, we are against rigged and managed international markets because we know that successful participation necessitates a comparable degree of control over the domestic economy as well. There is little debate of this fact, and those nations which accept a managed external trade as a necessary protective measure are generally willing to pay the price in internal regimentation. We are not. For us to do that would be as alien to our genius as it is repugnant to our conviction.

Second, we believe that the United States will be able to compete successfully in world markets, even though we have, and intend to maintain, wage scales far higher than those of the nations whose competition we must meet.

There is impressive evidence to substantiate the soundness of this conviction:

1. Wage scales, of themselves, do not determine the competitive position. They are meaningful only when translated into labor costs, by dividing wage rates by units produced. **A recent War Production Board study shows that in manufacturing industries generally, during the period immediately before the present war, production per man hour in the United States exceeded that in the United Kingdom, Germany and Soviet Russia by a ratio of more than 2½ to 1, and that of Japan by more than 4 to 1.** When comparison is made with available wage data, it appears that our labor costs are generally on a competitive plane.

2. Perhaps the best evidence of our ability to compete in export markets is the record of our demonstrated capacity to do so in the past. **During the entire period between World Wars I and II, the United States consistently commanded a greater share of the world's export trade than any other nation,** although the United Kingdom took a larger percentage of world imports.

3. We have been particularly successful in world trade competition in the export of machinery, vehicles, a variety of manufactured specialties, and certain agricultural products. Except in the last-named field, there is every evidence that we enjoy genuine competitive advantage over other nations, and this advantage will have been increased rather than diminished by developments during the Second World War. It is noteworthy that the goods in which we have been able to compete most successfully have generally been the products of our high wage industries rather than those in which low wages have prevailed.

☆ ☆ ☆

It is clear that, on a price basis, we shall be able to compete successfully in postwar markets in numerous lines. It is equally clear that such an opportunity is by no means of negligible importance to our own economy as a whole. During the years in which the censuses were taken between 1909 and 1939, our exports amounted

to from 7 to 16 per cent of our entire production of movable goods. **In the year 1938 our exports in each of the following lines accounted for more than 10 per cent of total domestic production of the particular product.**

(The figures in parenthesis are the percentages of total production exported.)

CRUDE MATERIALS: Phosphate rock (51.5), cotton (30.5), tobacco (29.4).

FOODSTUFFS AND BEVERAGES: Linseed (49.4), dried fruits (36.2), canned sardines (29.4), rice (21.0), fresh pears (15.9), canned salmon (13.8), canned asparagus (13.2), canned fruits (13.0), wheat (12.2), lard (11.7).

SEMI-MANUFACTURES AND FINISHED MANUFACTURES: Refined copper (53.1), paraffin wax (46.3), gum turpentine (42.6), carbon black (40.8), gum rosin (38.0), borax (35.9), crude sulphur (35.6), aircraft and parts (26.8), office appliances (22.3), carbons and electrodes (21.8), printing and bookbinding machinery (18.2), agricultural implements and machinery (17.0), biologic pharmaceuticals (15.3), industrial machinery (14.4), dental instruments and supplies (14.3), automobiles (14.1), benzol (13.3), goat and kid upper leather (12.8), refined lead (12.0), radio apparatus (11.8), caustic soda (11.4), refined mineral oils (10.6).

It is of major concern to all engaged in these lines of activity and in many others that foreign markets be not closed to us. It is particularly to our interest to have export outlets for our war-expanded capital goods and equipment industries. Since we undertook an important percentage of such expansion in order to furnish munitions to our Allies, it is reasonable to ask their cooperation in cushioning what inevitably must be a drastic readjustment here. The case is strengthened by the fact that the postwar world will desperately need the equipment items that we, alone, can supply.

But our demonstrated ability to compete on a price basis will not, of itself, assure us of foreign market outlets. Transportation costs, quality of product, marketing skill, technical and repair service—all are basically important. Still more important are non-discriminatory open markets and the command of dollar exchange by prospective purchasers. Our export potentials will surely be cramped in a world organized on the basis of bilateral deals and exchange controls. The availability of dollar exchange must depend upon the level of American imports and the volume of American capital loans.

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How are we to explain the skepticism of other nations toward an order which to us seems so clearly to represent not only our interest but the long-range interest of the world as well?

Soviet Russia, of course, is committed to conducting its external trade through its central government. But what of the United Kingdom? Why are there so many British voices that counsel the abandonment of what has been Britain's traditional position for more than a century? If we can understand that, we shall understand the dissent from our position of most nations whose economic positions have weakened and whose fiscal problems have multiplied during the two World Wars and the ill-starred period between them.

Essentially, their case is this:

Partly, they were forced into managed external trade policies by the Axis self-sufficiency programs, adopted in preparation for aggressive war. That can be corrected only by crushing the Axis, and by establishing a world security system that will make self-sufficiency a less compelling need.

But primarily, the reluctance of peaceably inclined nations to forego restrictive controls over postwar foreign trade stems from a deep-seated fear that is even more difficult to resolve. They fear, on the basis of past experience, that their efforts to meet payment balances arising from normal foreign trade would force a deflation of their internal economies, affecting prices, credit, wages, and finally employment. Faced with the choice, as they see it, between making adjustments in foreign trade or in their domestic economies, they lean toward the former as, at worst, the lesser of two evils.

☆ ☆ ☆

Since the kind of world trade system we seek is dependent upon international arrangements to assure reasonable stability of exchange rates between national currencies, we are challenged to find a formula that both will provide this and at the same time allay what other nations believe are legitimate fears with respect to their domestic economies.

But at least two major steps toward resolving such doubts can be taken upon our own initiative without recourse to the intricate process of international negotiation.

One is the rational overhauling of our tariff system, to provide other nations with increased opportunity to export to us. We can, and should, do this in a way that avoids undue cost to any segment of our economy.

The other, and probably the greatest contribution we can make toward winning a reluctant world to our point of view, will be to offer ample and convincing evidence that we are ready and able to provide a high level of employment in the United States. If we can do that, the rest of the world will wish to expose itself to our influence rather than to insulate against it, since prosperity here is the greatest single contributing factor to world-wide prosperity.

Balance of payment problems are minimized in a world of thriving trade. Britain would have little reason to resort to exchange controls if the total of postwar world imports and exports reaches an 80 billion dollar level. She may well be in a desperate plight if it should revert to the 1935 level of 40 billions.

☆ ☆ ☆

The United States wants a world in which private enterprise and competition play a major role. To obtain such a world will require a wiser, more understanding and firmer world leadership than this nation, or perhaps any nation, ever has exerted heretofore.

James H. McGraw, Jr.

President, McGraw-Hill Publishing Co., Inc.

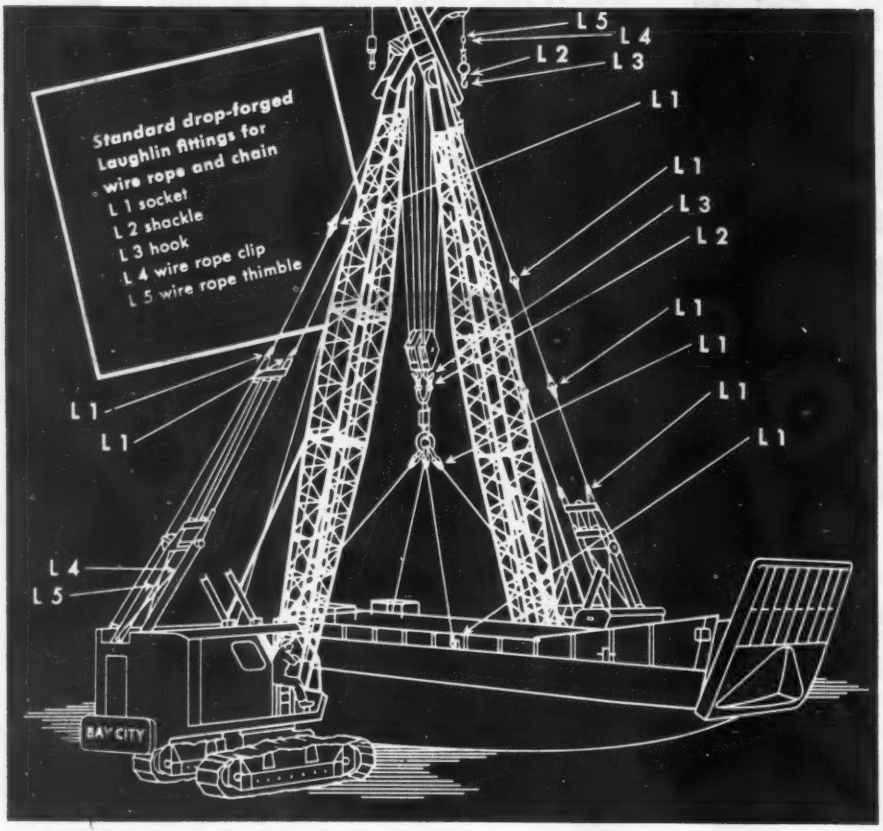
THIS IS THE 33RD OF A SERIES

The CRUSHER FOR *plus* OR *minus* 1" SIZES

A universal crusher for reducing mine run, lump, egg or nut. Run it fast and make 2" nut and slack. Run it slower and reduce to 1", 3/4", 5/8" or 3/8" with a minimum of fines. Ideal for making smaller domestic stoker sizes that can't be made with a single roll crusher.

THE JEFFREY MANUFACTURING COMPANY
ESTABLISHED 1877

SAVE TIME AND MONEY AT EVERY POINT



The L's mark the spots where you can save money in wire rope and chain fittings, by . . .

1. eliminating "specials" — Laughlin has the most complete line of drop-forged standard fittings.
2. protecting ropes and chains — husky Laughlin fittings take their full share of the load.
3. lasting as long or longer than ropes or chains.
4. protecting lives, loads, plant equipment — as with Laughlin's unique Safety Hooks.
5. reducing installation time — 3 "Fist-Grip" clips do work of 4 and are quicker to install.

Protect your investment in wire rope and chain with quality fittings. Specify Laughlin — fittings that save you time, materials and money. Write for complete catalog. Address Dept. 6, THE THOMAS LAUGHLIN COMPANY, Portland 6 Maine. Laughlin fittings are distributed through mill, mine, and oil field supply houses.

LAUGHLIN

THE MOST COMPLETE LINE OF DROP-FORGED WIRE ROPE AND CHAIN FITTINGS

Potter, Deputy SFAW Administrator, supplied these figures: West Virginia, 734; Pennsylvania bituminous, 407; anthracite, 200; Kentucky, 471; Alabama, 234; Virginia, 167; Arkansas, 5; Kansas, 0; Missouri, 2; North Dakota, 0; Oklahoma, 4; Illinois, 10; Montana, 2; Washington, 5; Maryland, 5; Colorado, 7; New Mexico, 4; Wyoming, 26; Iowa, 0; Utah, 20; Ohio, 20; Indiana, 5; Tennessee, 21.

"At first," said Dr. Potter, "we were limited to 2,000 deferments, but Selective Service later permitted certification to cover acutely critical cases in other than mines producing metallurgical coal. Because of the limited number of deferments it was necessary to reduce the number of certifications in all regions, and this was done on a proportionate basis. The number certified is approximately 50 percent of the number of applications received from the industry.

"Selection of the applications for certification was made by SFAW field officers. Consideration was given to the type of coal produced, occupational classification of registrant (whether skilled or unskilled, inside or outside), number of registrants in age group employed by company filing application and possibility of replacing registrant."

Originally some 6,000 miners in this age group received occupational deferments under 42-A (Special) certification, but the quota was reduced to 2,000, with the result that the occupational deferment of about 4,000 was cancelled.

•

The Preparation Plant As a Fuel Factory

"A modern coal plant may well be considered a factory"—and "must be so designed and operated," said Charles H. J. Patterson, washery engineer, McNally-Pittsburg Mfg. Corp., at a joint meeting of the Mining Electrical Group and the Illinois Society of Preparation Engineers and Chemists at West Frankfort, Ill., Feb. 1, 1945.

Users of coal, said Mr. Patterson, agree that uniformity is at least as important as average quality. Of two sources of supply with the same average analysis per month the one showing the minimum variation, above or below average, is the more desirable. The design of a coal-cleaning plant is almost as much a problem of economics as it is an engineering product. Economics, therefore, has a particular bearing on the choice of equipment units and processes. Mr. Patterson offered recommendations applying to certain of the more important aspects of fuel factory design.

Aside from providing crushing facilities and perhaps a loading track little need be provided in the way of lump coal preparation equipment in many districts. Provision must be made to break run-of-mine coal down to 6 or 7 in. This size is likely to be reduced to 4 in. or less in the near future. Where frequent changes in crushing size are expected an adjustable double-roll breaker is recommended. If such changes are unlikely the rotary or Bradford type breaker is recommended.

For the primary washing of Illinois

BUILT FOR "MILEAGE"

Westinghouse 8-ton cable reel locomotive serving mechanical loading machine at face, feeding empty cars to loader, hauling loaded cars to relay locomotive haulage road in Maiden Mine of Kelly's Creek Colliery Co. Rome "60-38" cable is shown in use.

Rome "60-38" Single Conductor Locomotive Gathering Cable

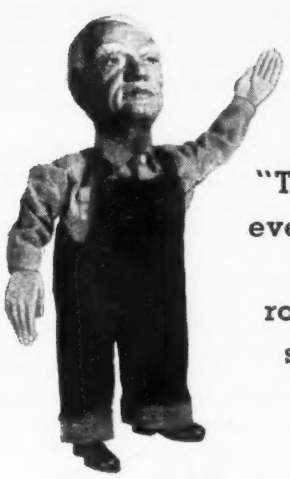
There's extra "mileage" built into every inch of this tough cable, which is recommended for electric locomotives of the gathering reel type or any other service requiring a flexible, heavy duty portable cable, where extreme adhesion of the insulation to the conductor is desired.

THE CONDUCTOR is composed of rope stranded, tinned copper wires. The individual ropes are laid up in a special manner to resist both tension and torsion.

A SPECIAL INSULATION is used having high electrical qualities and extreme adhesion to the copper conductor, preventing separation of the conductor from the jacket.

HEAVY TWINE REINFORCEMENT CORDS are applied over the insulation to strengthen the cable and control adhesion between insulation and jacket.

THE NEOPRENE JACKET is vulcanized in continuous lead moulds and has a high tensile strength, maximum resistance to tearing and abrasion, and long aging characteristics.



"This cable's got everything it takes to stand rough treatment," says **Romey**

FROM BAR TO FINISHED WIRE

ROME CABLE CORPORATION

ROME • NEW YORK

from working face to loading boom... use DUFF·NORTON Jacks

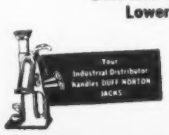
It is no easy job working at top speed to produce peak tonnage in these hectic times of overworked men and equipment. Husky, dependable Duff-Norton Jacks help your men in this production push by providing strong mechanical muscles to do the heavy lifting, lowering and holding.

You will find a Duff-Norton Jack for every mining requirement—built for long, safe service under the toughest conditions—in the wide range of types and sizes, listed in the complete Duff-Norton catalog. Write for your free copy today.

Duff-Norton Mine Roof Jack

Duff-Norton Journal Jack

Duff-Norton Automatic Lowering Jack



THE DUFF-NORTON MANUFACTURING CO.
PITTSBURGH, PA.

CANADIAN PLANT:
COATICOOK, QUE.

REPRESENTATIVES IN
PRINCIPAL CITIES

coals Mr. Patterson recommended the multi-cell Baum-type jig because of its provisions for separate discharge of middlings, automatic regulation of established separating gravities and rapid adjustment. Two-compartment washers were recommended with two-cell primary compartments for both coarse and small coal, except for very low tonnages. Small-coal washers should have three-cell secondary compartments.

Middlings from the coarse-coal washer should be crushed to 1¼ or 1½ in. and re-treated. A separate washer for rewashing crushed middlings from both coarse and small washers was recommended and has the advantage of using a gravity that is suitable for the material involved.

For fine-coal rewashing small high-frequency jigs, flotation cells, tables and other types of recovery equipment are available, with a trend to the use of free-discharge type of launders for this purpose. For best results it was recommended that the size of the sludge be increased to at least 10 mesh rather than ½ mm. when the fine coal rewash circuit is to be employed.

Adequate dewatering of coal above 1½ or 1¼ in. usually is accomplished by classifying screens. Where moisture specifications are not too stringent, 1¼x¾-in. coal and sometimes the ¾x$\frac{5}{16}$-in. size range may be dewatered on vibrating screens. The finest market size, $\frac{5}{16}$x½ mm., is dewatered on high-speed reciprocating horizontal dewatering trays surfaced with continuous-slot wedgewire screen, usually ½ mm., the through product going into the slurry. To prevent freezing of the coal, the dewatering can be done by centrifuging. Complete drying is not available without heat. Numerous types of thermal dryers are available but the reciprocating-screen type was recommended for Illinois coal. In drying fines thermally the process is complicated by having to use an updraft dryer and dust collectors.

A modern plant must have facilities for crushing egg and nut down to 1¼ or even ¾ in. with provision for reclassifying to regular market sizes. Stoker coal, 1¼ in. or ¾ in. with fines removed, is still the most valuable product.

Hot atomized sprays of relatively high-viscosity oil seem to provide the solution to dustproofing. For Illinois coal, oil spraying is recommended for sizes below 1¼ in. Dedusting is more easily accomplished by dewatering screens and settling circuits than by pneumatic dedusters or dry screens.

Additional facilities, not parts of the processing circuits, said Mr. Patterson in summing up, are gradually coming to be incorporated in the design of the more modern plants. These include fuel laboratories, service elevators, communication and signal systems, heating, washrooms and fountains.

•

Ickes Returns 72 Seized Mines

Secretary Ickes announced Feb. 24 that the government had returned to their owners 72 bituminous coal mines in West Virginia, Pennsylvania and Kentucky. The operations were seized in September to end

Like a Collar and Tie They Go Together!

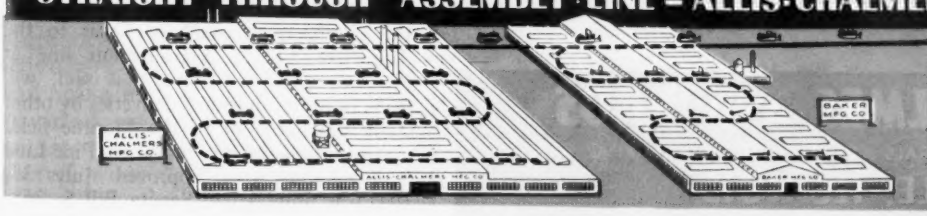
Baker bulldozers and gradebuilders are not adapted to—they're built specifically *for*—Allis-Chalmers tractors. They go together as snugly as a collar and tie. Look good together too! You get greater efficiency from your A-C power by using Baker equipment.

Since the introduction of the first A-C crawler tractor—over two decades ago—Baker has designed and built hydraulic bulldozers for every model A-C tractor as it was introduced. There's a model of Baker bulldozer and gradebuilder for every model of A-C crawler tractor. Today Bakers are predominantly favored by users of A-C tractors — because these users have found that *they go together!* Bakers are sold *exclusively* through Allis-Chalmers industrial tractor dealers.

THE BAKER MFG. CO.
514 Stanford Ave., Springfield, Ill.

If it concerns Victory, it concerns us!

"STRAIGHT THROUGH" ASSEMBLY LINE – ALLIS-CHALMERS TO BAKER TO YOU!



The modern Baker plant with its completely equipped fabricating, machining and blacksmithing shops adjoins the Allis-Chalmers crawler tractor plant. When you order an A-C tractor with Baker bulldozer or gradebuilder, your tractor leaves the A-C assembly line, crosses a narrow court and goes on the Baker final assembly line.

Sheave Wheels

on which your entire tonnage is dependent

Steel Liner . . . Renewable
Rim Full Machine Turned for True Running of Rope
Hubs Full Machine Turned
Spokes—Refined Wrought Iron

Holmes' Bicycle Type Head Sheaves are a heavy duty, light weight wheel, designed to eliminate undue bearing wear and avoid high inertia which consumes unnecessary power. Renewable steel liners with bolts locked against turning. Rim and liner full machine turned in the groove for true running and saving of rope wear. Hub ends machined for true running against bearings.

ROBERT HOLMES AND BROS.

BINS - GATES - LOWERING SPIRALS - DUST-O-LATORS - SHAKING GATES

DANVILLE, ILLINOIS

labor disturbances. He said that the return was ordered when officers of the United Clerical, Technical and Supervisory Employees withdrew a statement that its members would not work if government operation of the mines was ended.

Mr. Ickes stated that he had received a telegram from John McAlpine, president of the foremen's union, a division of District 50 of the United Mine Workers, cancelling the threat. The mines involved have a daily output of 145,000 tons and employ more than 25,000.

•

Ask Gas Line Permit Hugoton to Detroit

Application for permission to construct a 1,085-mile natural-gas pipeline from near Guymon, Okla., to points near Detroit and Toledo, Ohio, has been filed with F.P.C. by the American Light & Traction Co., it was announced Feb. 26. The cost of the line, which would be of 22- and 26-in. diameter, was estimated by the company at $51,500,000. With construction beginning not later than May 1, it would be completed this year. The line would tap the Hugoton field in Oklahoma. From Detroit it would extend to the Austin gas storage field in Mecosta County, Michigan.

The application stated the project is intended to supply the Ohio Fuel Gas Co. with 125,000,000 cu.ft. of natural gas a day and to fill requirements of the Michigan Consolidated Gas Co. above the quantity to be furnished by the Panhandle Eastern Pipe Line Co. under existing contracts.

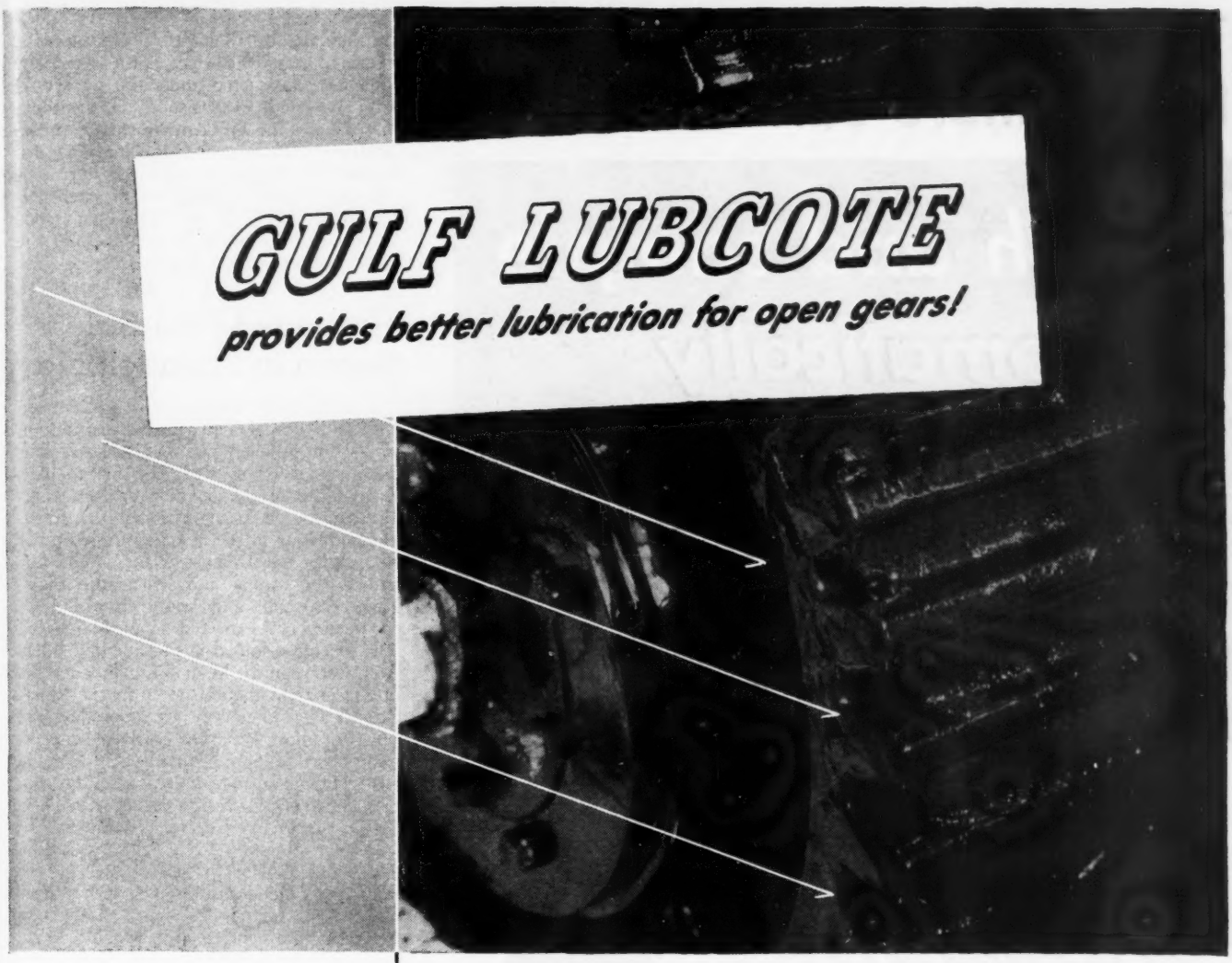
Panhandle Eastern Pipe Line Co., from whose lines Michigan Consolidated Gas Line Co. serves gas to Detroit, was given priorities in mid-February by the War Production Board's Office of War Utilities for a $9,000,000 project to increase gas deliveries from the Hugoton field to Michigan-Ohio areas by 50,000,000 cu. ft. by Nov. 1, 1945. FPC held a hearing Feb. 15 on an application for a certificate of construction.

To avert another critical gas shortage in the Appalachian area next winter, WPB assigned top priorities Feb. 23 to two pipeline projects costing $12,000,000. They are scheduled for completion by Nov. 1 next.

One project involves the addition of four compressor stations on the Tennessee Gas & Transmission pipeline from Monroe, La., to West Virginia. The additional stations will be built near Greenville, Miss.; Middleton and Springfield, Tenn.; and Frenchburg, Ky. They will make possible the delivery of about 60,000,000 cu. ft. additional gas daily into the Appalachian area.

The other project is for construction of about 140 miles of 24-in. pipeline from the Carthage gas field in Texas to the Tennessee Gas & Transmission line at Monroe, La. This line, it is said, will make possible additional deliveries by other major pipelines out of the Monroe field.

Amendment of the Petroleum Pipe Line Construction Act (approved July 30, 1941) is proposed in Senate Bill S. 368,



√ stays on √ saves wear √ helps keep them smooth-running

Four reasons... WHY GULF LUBCOTE IS A SUPERIOR LUBRICANT FOR OPEN GEARS

1. GULF LUBCOTE is a heavy-bodied product with a high degree of adhesiveness for metal surfaces —it stays on!

2. Due to the selected crudes used and to the process of refining employed, GULF LUBCOTE possesses unusual lubricating qualities.

3. The lubricating film provided by GULF LUBCOTE, in addition to being impervious to moisture, acid fumes, and gases, withstands extreme temperature changes.

4. Due to the tough and tenacious nature of GULF LUBCOTE, it effectively reduces objectionable gear noise and at the same time provides maximum protection against corrosion, pitting, or excessive wear of the gear teeth.

GULF LUBCOTE is made in seven grades, to provide for various methods of application and a wide range of operating conditions.

GULF LUBCOTE NO. 1 can be applied at normal atmospheric temperatures without heating, by brush, swab, or bath. In addition to gears this grade is an excellent lubricant for: flexible couplings, chains, cables, center plates and hub liners (railroads).

GULF LUBCOTE H.S. is especially manufactured to withstand the washing action of water. It is of medium viscosity and can usually be applied by hand without heating. Additional uses: chains and wire cables.

GULF LUBCOTE NO. 2 has approximately the same consistency as the H.S. grade. Principal uses: motor gears (street railways), guy wires, wire rope.

GULF LUBCQTE NO. 3 should be heated for easy application. Principal uses: chains, or applications where lubricants are subjected to transmitted heat.

GULF LUBCOTE NO. 5 must be heated for ready application. This grade has high heat resisting properties—a decided advantage when used on gears exposed to high operating temperatures.

GULF LUBCOTE TRACTION has the consistency of a No. 3 Cup Grease. It can easily be applied by hand at normal temperatures. Recommended for gears of street railways, mining and yard switching locomotives, etc.

GULF LUBCOTE W.R. is especially compounded for use by manufacturers in laying up wire rope and for impregnating hemp centers.

GULF INDUSTRIAL LUBRICATION

Gulf Oil Corporation · Gulf Refining Company

Division Sales Offices:

Boston · New York · Philadelphia
Pittsburgh · Atlanta · New Orleans
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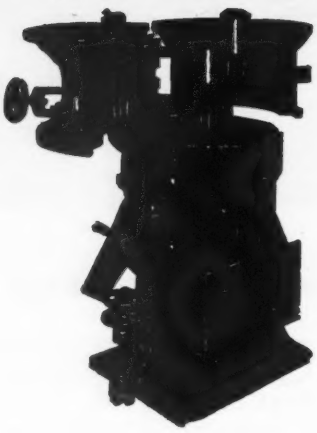
The first step in getting better, more salable coal . . .

crush and sample automatically and quickly— process one ton in one hour . . .

WITH THE

STURTEVANT

Automatic



Simply feed your coal and coke into the improved Sturtevant Automatic Coal Crusher and Sampler and get samples that are truly representative of all material passed through, crushed to a fineness of practically all minus 8 mesh screen size. Provision is made to obtain 5, 10 or 15% samples as desired.

By the Sturtevant method—32 of the 34 tedious operations ordinarily required by hand sampling are eliminated. In addition, greater accuracy and speed of sampling are assured. Thus your customers can get the B. T. U.'s they WANT because YOU can guarantee them what they are paying for—the blend they want—the most economical coal for their purpose—and you can supply this important information before they burn it—insuring better boiler performance, lower maintenance and savings in their fuel bills.

SEND FOR BULLETIN

Completely describes this Unit Boost your Coal Sales—satisfy more customers—and help the War effort!

STURTEVANT MILL CO.

14 HARRISON SQUARE

BOSTON 22, MASS.

introduced by Senator O'Daniel (D., Texas), to provide that in the event any pipeline constructed under the act should ever be used to transport or distribute natural gas, the President in such event be authorized to take over the line and dismantle it and dispose of the materials as salvage. Upon completion of such dismantling the lands or interests in lands acquired under the act shall revert to the persons from whom acquired.

•

Packaged-Fuel Sale Begun in Philadelphia

Gimbel Bros., Philadelphia, has entered into sales arrangements for the distribution of "White Glove" packaged fuel and thus becomes, it is believed, the first department store in the country to engage actively in the marketing of a coal fuel. Regular production of the new fuel from a plant for which the Defense Plant Corp. furnished the capital and which the Blaw-Knox Co. built and leased from D.P.C. for operation is expected about March 15. The objective, joined in by the Solid Fuels Administration for War, was augmentation of the household fuel supply in the Philadelphia area. Pending regular production, sufficient fuel has been derived from a pilot plant to permit Gimbels' to set up a display and operate a demonstration furnace for a week. Orders were being taken for delivery between April 1 and Sept. 1, 1945.

"White Glove" packaged fuel is described as a blend of anthracite and bituminous fines further crushed, dried and treated before being compressed into 3-in. cubes with an asphaltic binder. The cubes then are wrapped six in a package (267 packages to the ton) by automatic machines. The blend is stated to be 75 to 80 percent anthracite and 20 to 25 percent bituminous. Blaw-Knox is arranging for delivery in special trucks. "White Glove" packaged fuel will be sold at the plant, at department and neighborhood stores and at service stations. The retail price in Philadelphia is stated to be $13 per ton or $1 for 17 packages, delivered.

•

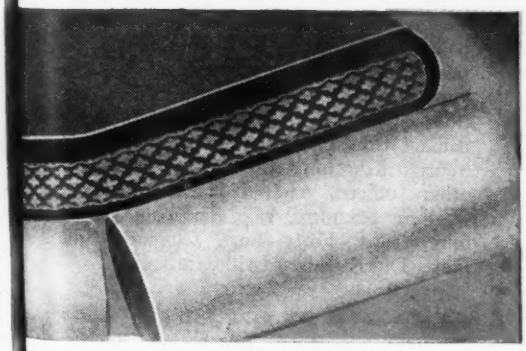
Grievance Machinery For Foremen Urged

Recommendations that grievance machinery be established by twelve large corporations for their foremen and supervisory employees have been made public by the National War Labor Board. The controversies, involving about 7,600 foremen and other supervisory employees, have been considered by a panel authorized May 18, 1944, consisting of Sumner H. Slichter, professor of economics, Harvard University, and public member of the First Regional WLB at Boston (chairman); William Spohn, Madison, Wis., attorney and arbitrator; and Dean Robert D. Calkins, School of Business, Columbia University, New York City.

The questions of bargaining rights and union recognition were not considered by the panel, as in such matters NLRB alone has jurisdiction and under its present policy

Courtesy of Goodman Manufacturing Company

–a MANHATTAN development that increases tonnage flow from your underground workings



Detail of Homocord Strength Member construction. Open fabric structure permits FLEXLASTICS to penetrate and unite all parts into a homogeneous whole.

ADVANTAGES OF HOMOCORD CONVEYOR BELTS

1. Complete bonding of every member into a homogeneous structure. **2.** Holds metal fasteners. **3.** Lateral flexibility permits perfect troughing, accurate training, reduces fatigue of flexing at bend in troughing idlers. **4.** Resists destructive action of continuous or heavy impact feeding. **5.** Cushion Homocord body and low inelastic stretch reduce wear and tear of top cover. **6.** Homocord body reduces hazard of punctures. **7.** Homocords so completely encased in Flexlastics, moisture not admitted, mildew cannot start. **8.** Longer life, lower cost per ton.

Homocord construction, invented and perfected by MANHATTAN engineers, for conveyor belt use only, is the first and only conveyor belt possessing the virtues of a cord belt with the drawbar strength and resistance to fatigue to hold metal fasteners.

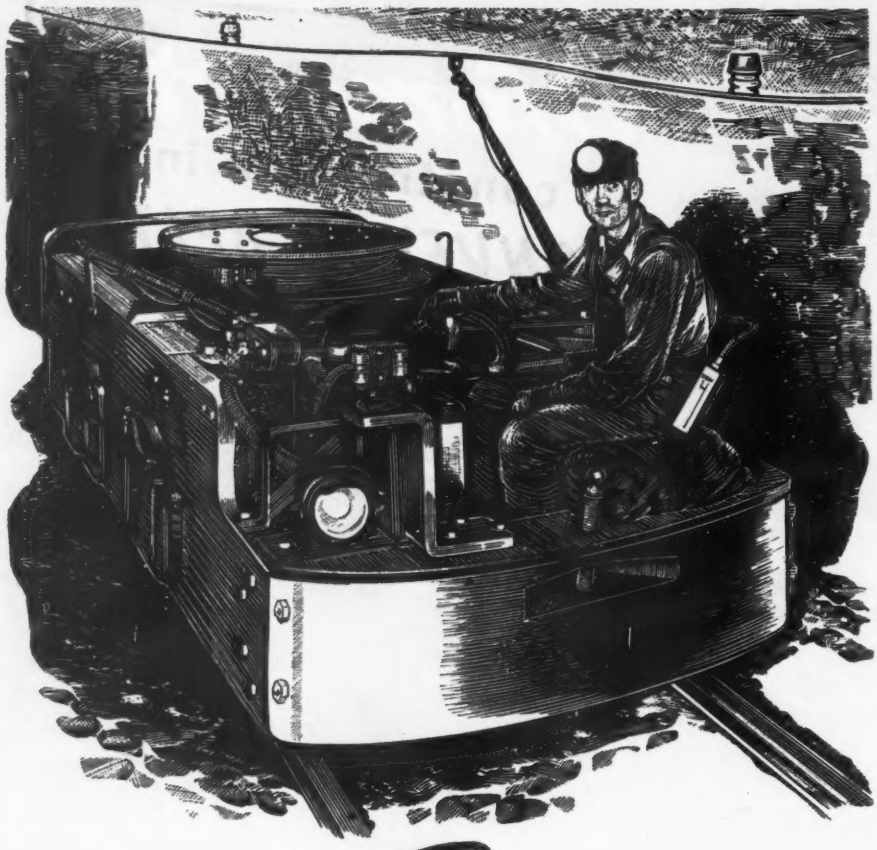
Longitudinal Homocord Strength Members, grouped to give great tension strength, are tied together with cross Homocords to allow exceptional troughing for full loading.

These component Strength Members, sealed-in with moisture-proof FLEXLASTICS*, and mildew-proofed for added protection, have a flexible, resilient, rolling contact with each other to provide cushioned resistance for heaviest feed impact and protect the tough wear-resisting cover from abrasion and puncture.

Other brands of MANHATTAN Conveyor Belt for special services are also made with FLEXLASTICS* and specially designed Strength Members to distribute load strains uniformly. Longitudinal and transverse flexibility provides power-economy, traction and easy troughing. Mildew-proofed for underground service, oil-proofed where needed, and compensated to equalize ply-stresses over small pulleys.

*The term FLEXLASTICS is an exclusive MANHATTAN trade mark. Only MANHATTAN can make FLEXLASTICS.

THE MANHATTAN RUBBER MANUFACTURING DIVISION
OF RAYBESTOS-MANHATTAN, INC.
EXECUTIVE OFFICES AND FACTORIES PASSAIC, NEW JERSEY



Going Prospecting

FOR POWER SAVINGS?

...You'll discover about 20% greater conductivity in Thermit-welded continuous rail

One way a mining executive can reduce maintenance is to go prospecting for power losses along main haulage track. It's surprising how many joints between rail lengths, how many battered, chipped rail ends can be discovered...that leak current and "up" power consumption costs.

But happily, there's a tried and true remedy—Thermit welding. For when you Thermit weld jointed track into continuous rail, you increase conductivity around 20%—a saving that remains constant because a Thermit welded joint has the same conductivity as the rail itself.

In addition, Thermit welding brings you other benefits. There is less wear and tear on rolling stock. Higher operating speeds with less spillage become a reality, since the track holds its line and surface better. And track maintenance is greatly reduced, since joints are eliminated and the majority of such work occurs at the joints of bonded track.

Thermit welding can be done by your own crew after instruction by a Metal & Thermit supervisor. Write for full details.

METAL & THERMIT CORPORATION
120 BROADWAY, NEW YORK 5, N. Y.
ALBANY · CHICAGO · PITTSBURGH · SO. SAN FRANCISCO · TORONTO

THERMIT Welding

(Maryland Drydock Co. case) employers are not required to carry on collective bargaining with supervisory employees' organizations. In the case of the Packard Motor Co., NLRB is now reviewing its general policy in this matter.

•

To Merge Pittsburgh And Consolidation

Tentative plans for merger of the $125,000,000 Pittsburgh Coal Co. and the $32,000,000 Consolidation Coal Co., Inc., were revealed March 1 by officials of the two organizations, indicating that the proposal had been submitted to government agencies for approval. If sanction is granted, action will be asked of the boards of the two companies, with submission to stockholders' meetings about June 1.

•

Anti-Cave Bill Reaches Penna. House

A new proposal to create an anthracite subsidence commission to help prevent cave-ins in the hard-coal region was presented in the Pennsylvania House of Representatives Feb. 28. Sponsored by Representatives John L. Boney and Martin L. Murray (both D., Luzerne), the bill would set up a three-member agency and provide a $50,000 appropriation for its work. The commission would have authority to make subsidence studies to prevent loss of life, review different methods of filling mined-out areas, develop special plans to prevent surface cave-ins and find a use for coal-breaker waste.

Meeting Jan. 28 in Forty Fort (Pa.) Town Hall, representatives from municipalities in Luzerne and Lackawanna counties set up a permanent organization to be known as the Pennsylvania Surface Protection Association, to guard against property damage from mine disturbances. Willard Shortz, Kingston, was elected chairman, other officers chosen including Paul Shorten, Scranton, vice chairman; Benjamin Evans, Forty Fort, secretary, and James Dukas, Edwardsville, treasurer.

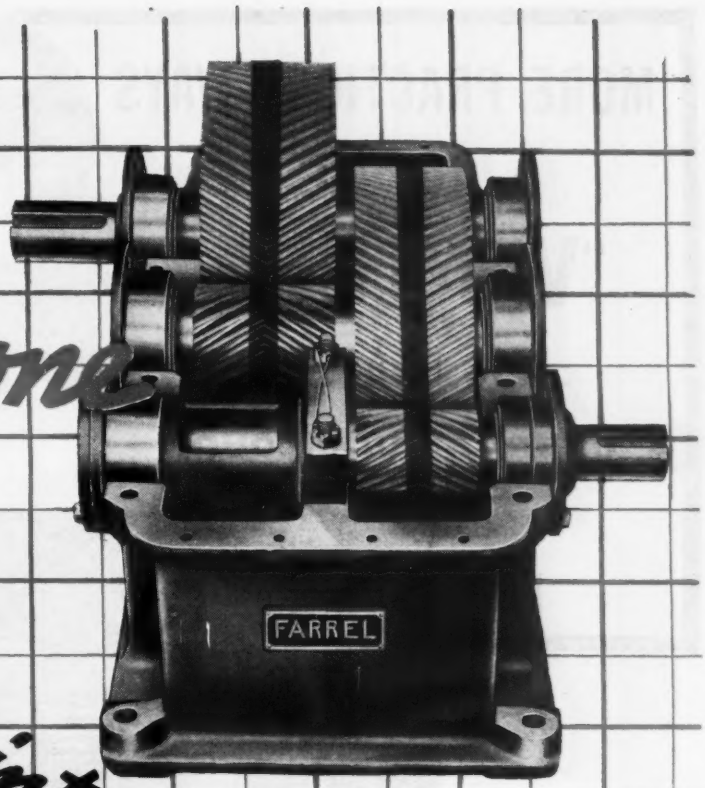
•

Penna. Miner Loads 17 Tons Daily

Praise was heaped by Governor Edward Martin of Pennsylvania on Louis Polin, Indiana County miner employed by the Cherrytree Coal Co., St. Benedict, Pa., for his 1944 work record of loading 4,862 tons of coal, an average of 17 tons daily, during 297 working days. In addition to his coal loading work Mr. Polin wrote that he worked 119 hours removing slate. He said he was away from work only five days during the last year, and that absence was due to illness of his wife.

"It was a marvelous thing," Governor Martin told his weekly press conference Feb. 2. "If all miners would do that, there would be no coal shortage today."

This Backbone means lower maintenance cost per ton



The gears in Farrel Speed Reducers are the precision generated *Gear with a Backbone* type. The *backbone* (shown by the red area in the photograph) is formed by the juncture of the two helices to form continuous herringbone teeth, without a center groove.

The greater working face provided by the continuous teeth gives the gears extra strength and capacity to withstand the shocks, stresses and wear encountered in coal mining service. Combined characteristics of overlap or interlacing of the teeth, gradual engagement and inclined line of pressure distribute the load uniformly over the entire face width, and contribute to smooth, quiet operation and maintenance of correct tooth action throughout a long gear life.

Other features which contribute to continuity of operation, with minimum maintenance, are:

1. Shafts ground to close tolerances and rigidly mounted in anti-friction roller bearings.
2. A lubricating system which provides ample oil supply to gears and bearings without danger of excess heat and wear.
3. Heavy, rigid housings which maintain accurate alignment of rotating elements.

Farrel Speed Reducers are available in a complete range of sizes, for any application. Ratios of single reduction units range from 1¼:1 to 10:1, double reduction units up to 60:1, and triple reduction units up to 180:1. For complete information write for Catalog No. 438.

FARREL-BIRMINGHAM COMPANY, INC.

ANSONIA, CONN. • BUFFALO, N. Y.

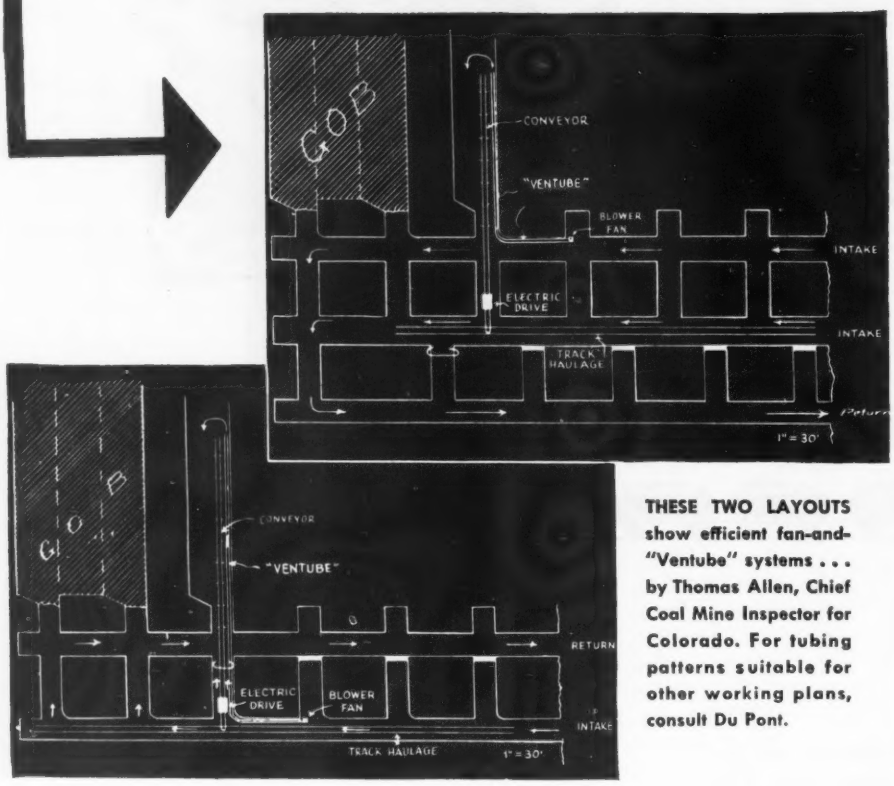
Plants: Ansonia and Derby, Conn., Buffalo, N. Y.

Sales Offices: Ansonia, Buffalo, New York, Pittsburgh, Akron, Los Angeles, Tulsa, Houston

FARREL *The Gear with a Backbone*

Farrel-Birmingham

MORE PRACTICAL WAYS TO USE "VENTUBE"* ...to help make every minute count!



THESE TWO LAYOUTS show efficient fan-and-"Ventube" systems . . . by Thomas Allen, Chief Coal Mine Inspector for Colorado. For tubing patterns suitable for other working plans, consult Du Pont.

EFFICIENTLY OPERATED, blowers and tubing are a big aid to top-speed war production of coal. For "Ventube" carries clean air into working spaces where the main air current would never go unaided. Thus it brings work-speeding oxygen to hard-working men. "Ventube" clears the face quickly after blasting—helps make *every minute count!*

• • •

Properly suspended, free of sharp bends, and attached to a fan of adequate capacity and with permissible motor, "Ventube" sweeps the face with fresh air. It helps remove dust and bad air from any space a man can enter—speeds the coal cycle—promotes health and steady working efficiency. Coated and impregnated with a special chemical compound, "Ventube" resists abrasion, heat, moisture, mildew, dry-rot, acid and alkaline waters. It is easily carried, stored and repaired. E. I. du Pont de Nemours & Co. (Inc.), Fabrics Division, Fairfield, Conn.

NOTE: *War Production Board regulations permit us to supply "Ventube" for all mining purposes. To expedite delivery, it is urged that you furnish complete priority information on your orders.*

"DU PONT VENTUBE"

"VENTUBE" is Du Pont's registered trade mark for its flexible, rubberized ventilating duct.

DU PONT

BETTER THINGS FOR BETTER LIVING ... THROUGH CHEMISTRY

Colorado Site Picked For Oil-Shale Plant

Selection of a site near Rifle, Colo., for a $1,500,000 oil plant for testing processes for getting oil from shale was announced Feb. 24 by Secretary of the Interior Ickes, who also is Petroleum Administrator for War. The new plant is to be established in the Anvil Points area, about 7 miles west of Rifle. It is to be built on government-owned land and operated in conjunction with an oil-shale research and development laboratory that is to be built at Laramie, Wyo.

•

New Owners and Marketers Take Over

Maryland Coal & Coke Co., Baltimore, has become exclusive sales agent for the output of the Century No. 1 mine, formerly owned by the Century Coal Co., of the same city. The Maryland Century Coal Co., organized as a West Virginia corporation, opened headquarters in the Maryland Coal & Coke Co. offices as of Feb. 1. Located at Century, Barbour County, W. Va., the Century No. 1 mine has a daily production capacity of 1,200 tons.

Amigo Coal Co., Amigo, W. Va., operating the Pocahontas No. 3 seam in the Winding Gulf district, has been purchased by the Minter interests, Beckley, W. Va. The coal will be distributed after April 1 by the Minter Fuel Co., Beckley, of which E. C. Minter is president.

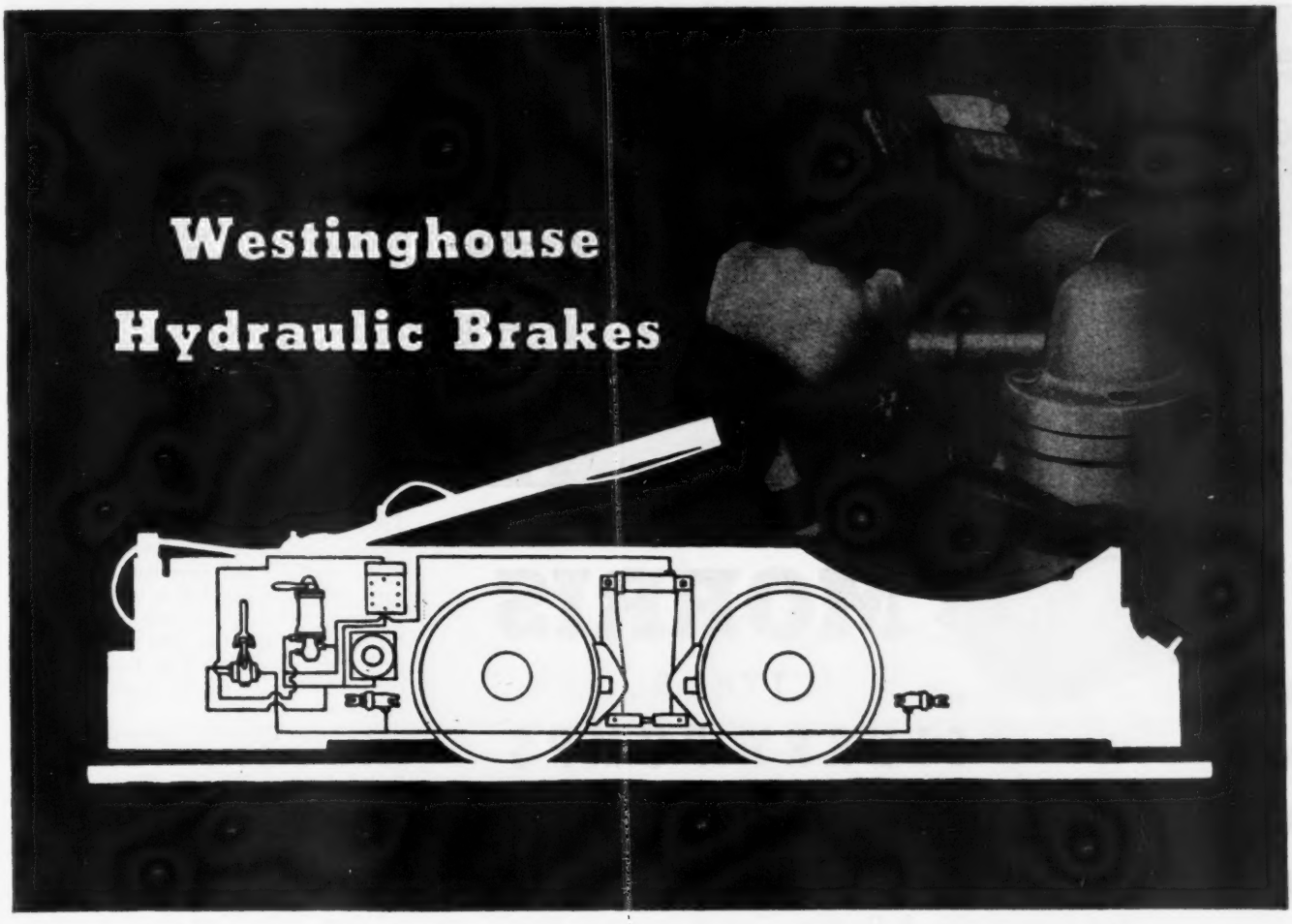
The D. A. Bart Co., Wheeling, W. Va., announced the sale Feb. 22 of two mining properties in Jefferson County, Ohio. The properties were the Betsy mine, near Smithfield, and the Sydney mine, near Fernwood. The purchaser was the North American Coal Corp., which operates the Powhatan mine, largest in the State. With the mine went thousands of acres of coal land, shovels, tipples and railroads. The two plants produced nearly 1,000,000 tons of coal last year.

•

To Build Model Homes For Gorgas Employees

A model coal-mine village comprising modern homes with running water, sanitary facilities, bathrooms and other modern conveniences, each located on a plot of about an acre, is to be built by the Alabama Power Co. for its employees at Gorgas mine and Gorgas steam plant. The cost of improvements, including streets, water and electric systems and sanitary facilities, will be about a half million dollars. A total of 575 is employed at the mine and steam plant, the latter consuming about 3,400 tons of coal a day when operating at capacity. When completed, the homes will be offered for sale to the company's employees on easy terms.

The setting, near Goodsprings, Ala., will offer city advantages in a rural setting. Employment will be nearby; reasonable local shopping facilities exist and those of



take the brake off coal production

What one User Reports . . .

Brake shoe life increased from one week to three months.

•

Wheel turning decreased 50%.

•

Motor bucking to check speed and to stop entirely eliminated.

•

Shocks to mechanical and electrical apparatus greatly reduced.

•

Less sand required . . . better rail contact cuts power loss and overheating.

The first step in boosting haulage schedules is to shorten the time of brake application and release. Slow hand braking puts a ceiling on safe speeds and limits production. Westinghouse Hydraulic Brakes raise the speed ceiling and expand production.

The exclusive pressure-graduating brake valve gives complete control of braking effort, and eliminates operator fatigue. Speeds on grades can be higher, heavier loads can be safely handled, spotting and gathering are accelerated.

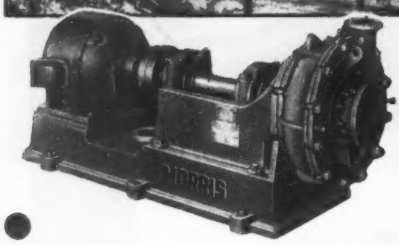
All equipment is simple, rugged and compact. This Westinghouse power brake can be easily installed on your present locomotives in your shop, without changing existing rigging. Ask for circular S.P. 9092.

Westinghouse Air Brake Company

INDUSTRIAL DIVISION

General Offices: Wilmerding, Pa.

76 Years of Pneumatic Control Experience



MORRIS

TYPE S

SLURRY PUMPS

Pump No. 5 Buckwheat Screenings

The Philadelphia & Reading Coal & Iron Co. lays aside 900,000 tons of buckwheat No. 5 screenings a year through the wet cleaning process. Two eight-inch pipe lines, each 1,795 feet long, are used to transfer the slush from the thickener to the slush pond. Containing 15 percent solids, this abrasive mixture is pumped at the rate of 2500 G.P.M. by two six-inch Morris Centrifugal Pumps, directly driven from dual shaft extensions of a 250-hp motor, and cross connected to function as a two-stage unit. There is also a similar Morris standby unit for emergency use.

Morris Slurry Pumps are ruggedly built to withstand the most severe operating conditions. Wearing parts of the pumps in this service are of Morris FLINTMETAL "S", an extremely abrasion- and corrosion-resistant alloy. The patented pressure-balanced impeller minimizes re-circulation, promotes smoother flow and increases pumping efficiency. 81 years of pump building experience is behind every Morris Pump.

MORRIS MACHINE WORKS
Baldwinsville, N. Y.

MORRIS
CENTRIFUGAL PUMPS

Jasper and Birmingham can be reached over good roads. Churches and schools already are established near the new community and efforts are under way to bring about construction of a new centralized school. Those interested in fishing and hunting will find sport almost at their back doors, as the Warrior River abounds in fish and the surrounding hills have small game. Garden and poultry enthusiasts also will be able to indulge those hobbies without being cramped for space.

•

Anthracite Producers Make Additions

Completion of the D & F Coal Co.'s new breaker near Minersville, Pa., has made available a large tonnage of new anthracite. Full capacity output of about 1,200 tons monthly is to be reached soon, according to Frank H. Dippel, president of the company, who predicts that it will ship more than 350,000 tons this year. William N. Dippel and Fred Fox also are connected with the company. The Foreston Coal Co., New York City, has been appointed exclusive sales agent.

Northwest Coal Co., Carbondale, Pa., is gradually completing its new breaker on the Ontario & Western R. R. at what formerly was the Raymond colliery of the Scranton Coal Co. The plant, which is of wood, is equipped with a Chance cone to clean coal. Work also is progressing on reopening the Raymond operation.

Lehigh Valley Coal Co. has resumed operation of the Franklin colliery, Wilkes-Barre Township, Pa., after having leased it to the Paknotti interests. The mine employs 350 men. Pagnotti interests will continue to operate strippings at the colliery, it was reported.

•

Lausche to Push Strip Restoration

Governor Lausche of Ohio indicated Feb. 16 he would push legislation requiring restoration in strip mining areas regardless of the opposition of the U. S. Solid Fuels Administrator. In telegrams to the Governor and the State Senate Conservation Committee, Charles J. Potter, Deputy Solid Fuels Administrator, said he opposed legislation that would require additional manpower and machinery to restore areas devastated by strip mining.

The Governor expressed the belief that legislation should be enacted now because strip mining is at its height now, because of the war, and damage cannot be repaired by retroactive legislation after the war. However, the Ohio executive said he thought restoration could wait until after hostilities had ceased. He pointed out that the bill introduced in the House in mid-February, presumably with administration support, does not require immediate restoration of devastated lands.

Strip miners, operators, land owners and businessmen met Feb. 12 in Philipsburg, Pa., and filed a protest against a bill in the Pennsylvania Senate designed to regulate strip mining in the bituminous fields

AMERICAN STEEL & WIRE COMPANY
Cleveland, Chicago and New York
COLUMBIA STEEL COMPANY
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United States Steel Export Company, New York

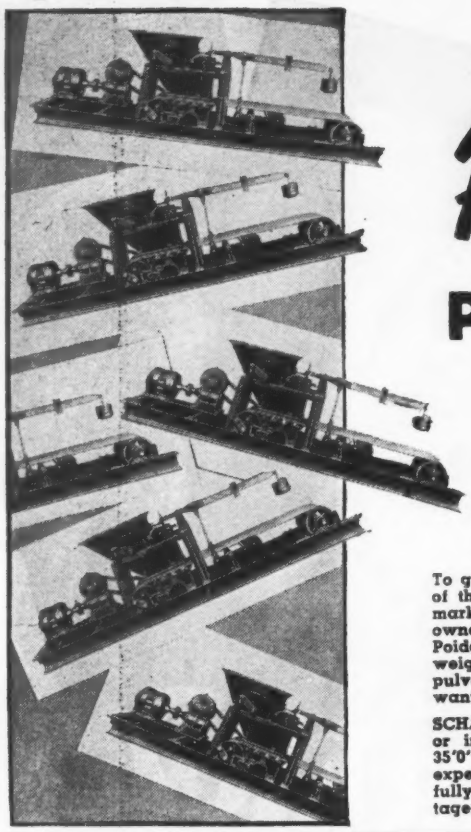
UNITED STATES STEEL

. . . An Authoritative Guide on Its Selection, Use and Care

JUST off the press—AMERICAN TIGER BRAND'S new catalog—125 pages crammed with illustrations, specifications and descriptive material to help you select the wire rope that's exactly right for your particular job. In addition, special chapters feature modern methods of splicing, socketing, lubrication, and other facts essential to the proper use and care of wire rope in every field.

This catalog covers the complete range of both AMERICAN TIGER BRAND Excellay Preformed and AMERICAN TIGER BRAND Standard Non-Preformed Wire Rope and accessories.

This valuable book, with its quick-reference indexed pages should be in the hands of every man who buys or uses wire rope. A request on your letterhead will receive prompt attention.



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are speeding preparation— sizing and blending throughout the U. S.

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SCHAFFER Poidometers may be used singly or in batteries, with pulley centers up to 35'0", thus eliminating extra conveyors and expense. SCHAFFER Catalog #8 describes fully the construction, operation and advantages of these units. Write for your copy.

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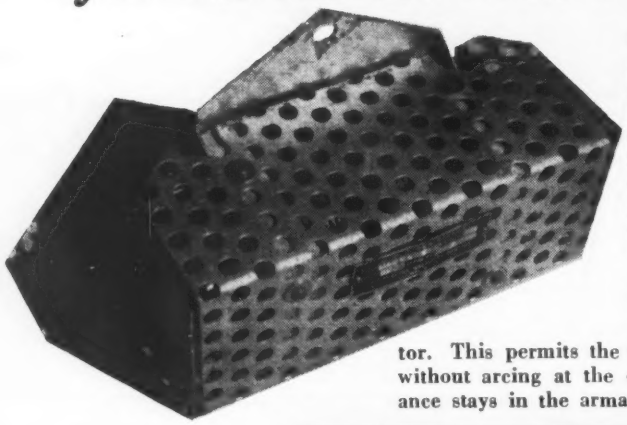
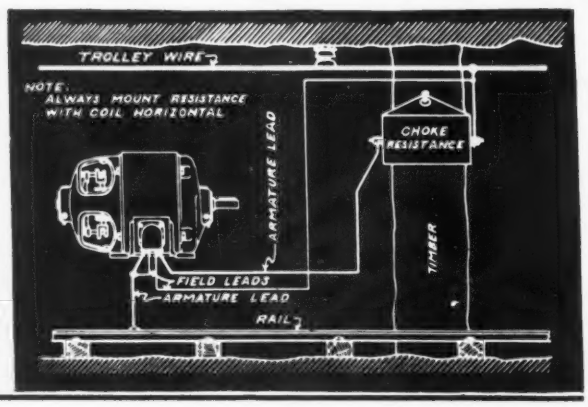
for direct current motors



G.M.C. Choke Starters consist of a resistance coil, which connects in series with the motor armature. Resistance offered is sufficient to choke back the initial inrush of current when the motor is connected directly across the line . . . or when a circuit breaker has been out and recloses on the motor. This permits the motor to start smoothly without arcing at the commutator. The resistance stays in the armature circuit at all times, thus eliminating the need for an automatic switch of any kind. The starter requires no operator.



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of the State. The measure, sponsored by Senators John H. Dent (D. Westmoreland) and J. Fred Thomas (R., Mercer), it was charged, would penalize strippers excessively because of the provisions requiring reforestation of mined-out areas.

A proposal to require strip operators to restore mined areas in Indiana to their former natural contours was defeated, 22 to 62, in the State House of Representatives, in Indianapolis, Feb. 16.

•

Employer-Management Forum Set Up

Designed to bring problems in management and human relations more directly to all branches of management, H. J. Connolly, president, Pennsylvania Coal Co., Scranton, Pa., has introduced a new program to be known as the Pennsylvania Coal Co. plan. Divided into two parts, it will include at first a series of background lectures dealing with the industry and the company's part in it during its 100 years' existence. This part will draw on men of experience and high reputation in the industry for their contributions. In the second period, the conference plan will be virtually taken over by the mine superintendents, mine foremen and their assistants specializing in various phases of management. This will have for its goal, it was explained, bringing a greater understanding all along the line by pooling all minds in solving problems that confront the company and the industry.

•

Would Amend Laws On B. C. Mines

Amendment of the Coal Mines Regulations Act in British Columbia is being sought. A delegation from District 18, United Mine Workers, submitted a brief asking statutory payment of time and a half for overtime; two weeks' holiday with pay after a year's employment; compulsory suspension of mine work on days on which fatal accidents occur; payment by the employer of members of the workmen's inspection committee; government employment of firebosses to assure impartial safety reports on underground workings; compulsory provision of washhouses at collieries employing 20 or more men and government sanitary inspection of coal-mining camps and posting of reports.

Briefs submitted to the Carroll Royal Coal Commission show that Nova Scotia representatives of the industry want:

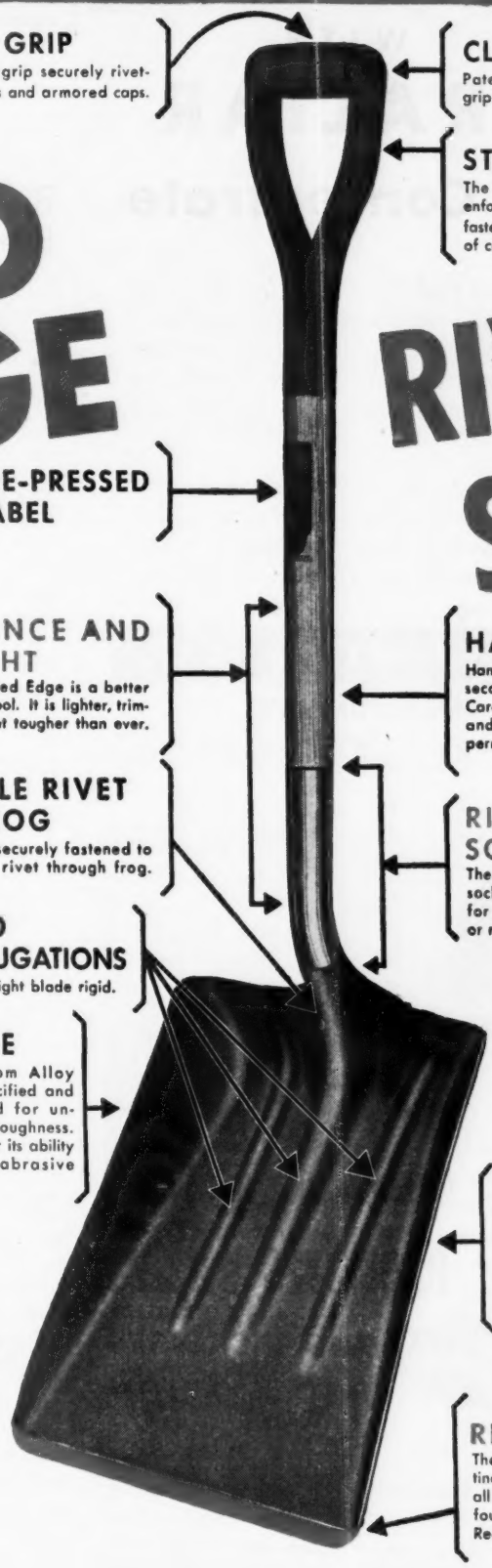
1. A greatly expanded market to stabilize the industry permanently, especially in Ontario and Quebec.
2. Federal assistance for expansion, for revival of subventions and for scientific research to utilize coal byproducts.
3. Greater federal and provincial control; following federal investigation, control by that authority; also that the war policy of zoning markets continue after the war.
4. Aid through subsidies for consumers of Nova Scotia coal.

Canada's coal production in 1944

Light in Weight but Heavy in *Quality*

AMES *Since* 1774

Wyoming RED EDGE RIVETLESS SOCKET



WIDE GRIP
Full wood grip securely riveted to forks and armored caps.

CLIPS
Patented rivet clips lock the grip to sides of handle.

STEEL CAPS
The forks of the handle are reenforced by steel caps securely fastened to grip and forks. Top of cap is fitted over end of grip.

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BALANCE AND WEIGHT
This new Red Edge is a better balanced tool. It is lighter, trimmer and yet tougher than ever.

HANDLES
Handles are manufactured from second growth Northern Ash. Carefully sanded, highly waxed and polished. Rivetless socket permits easy rehandling.

SINGLE RIVET IN FROG
Handle is securely fastened to shovel by rivet through frog.

RIVETLESS SOCKET
The elimination of rivets in the socket gives a smooth surface for sliding of hand. No sharp or rough edges.

RIBBED CORRUGATIONS
Make the light blade rigid.

BLADE
Made from Alloy Steel specified and approved for unequaled toughness. Famous for its ability to resist abrasive wear.

HEAT TREATED
Blade is heat treated by electrically controlled furnaces giving just that right amount of hardness and ductility.

FEATHERWEIGHT COAL SHOVELS

RED EDGE
The painted red edge is a distinctive mark of identification on all Red Edge Shovels. It is only found on the genuine Wyoming Red Edge.

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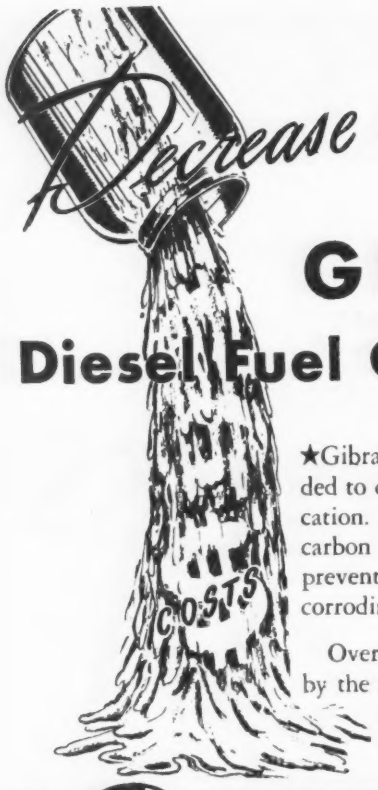

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Overall operating costs are considerably reduced by the increased power, lowered fuel consumption and reduced maintenance obtained by using Gibraltar Diesel Fuel Oil Concentrate.

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HOOD REFINING CO.

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P-G Automatic TRANSFER SWITCH

PROMOTES Safety

AND INCREASES PRODUCTION

Eliminates hand switches—entirely automatic. No shocks or burns to operator while changing from trolley to reel or vice versa. Simple, safe, efficient, easy to install, can be mounted anywhere. For 250 or 550-volt service in single or double trolley and reel. Complete with cover.

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THE POST-GLOVER ELECTRIC COMPANY

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totaled 17,070,117 tons, against 17,859,057 in 1943, a decline of 848,940 tons, or 4.8 percent, according to the Dominion Bureau of Statistics. Coal imports in 1944 increased to 28,926,925 tons from the 1943 total of 28,852,654 tons, while exports declined to 1,010,240 tons from 1,110,101 in 1943. Coke production in 1944 increased to 4,001,000 tons from the 1943 total of 3,550,000 tons.

•

Big Sandy Mines Break Output Records

In response to a Solid Fuels Administration request for increased coal production because of severe weather conditions in the northeastern states, coal mines in the Big Sandy field of eastern Kentucky broke all weekly production records in the week ended Jan. 27, with a shipment of 328,230 tons, according to H. S. Homan, secretary of the Big Sandy-Elkhorn Coal Operators' Association. This compares with 309,460 tons in the preceding week, which also was a record up to that time.

The largest weekly shipment prior to that was during the week ended Sept. 30, 1944, with 307,830 tons, while the average weekly shipment for the entire year, not including wagon and truck mines, was 280,000 tons. Total production for the Big Sandy field in 1944, including wagon and truck mines and coal used locally at various plants, was 16,186,091 tons.

•

WLB Gains Power On "Fringe" Awards

The War Labor Board's demands for revision of procedure in granting "fringe" wage adjustments that may involve price increases was met in mid-February, it is reported, through a new agreement between WLB and Economic Stabilization Director Fred Vinson. The Labor Board had complained against a recent Vinson ruling under which OPA had the final say on whether any "fringe" wage adjustment could be allowed, and had delayed action in many cases, feeling that its hands had thus been tied. The "fringe" issues involve shift differentials, vacation pay, severance pay, promotions and reclassifications, incentive pay and similar means of increasing take-home pay without raising the basic hourly wage above the Little Steel formula.

Under the new agreement as reported, WLB will set up a definite policy with respect to "fringe" wage demands, including specific criteria under which such requests may be granted and limitations upon their extent. The Board will pass on each case on its merits and if a "fringe" award is ordered by WLB and approved by Director Vinson it will stand as ordered. It will then be up to any individual employer who feels that the award justifies price relief in his case to appear before the Office of Economic Stabilization, which will consult with OPA as to whether such relief should be granted.

Send for new 24-page Catalog No. 14. Gives complete specifications and shows Dragliners on many types of jobs.

THESE 5 FEATURES MAKE THE DRAGLINER THE BEST BUCKET BUY TODAY!

1 Heavy, round manganese steel combination bumper and drag hitch receives all of the impact when bucket is dropped. *Bucket cannot drop on arch.* Hitch link automatically folds inside—arch cannot strike chain.

2 "Flat top" arch eliminates binding of material in digging and dumping. Arch and bumper are well forward of the teeth exerting their weight on lip and teeth, increasing digging efficiency.

3 3-way dump hitch can be used in choice of three positions—one for fast dumping, one for average work and one for truck, hopper or carloading work.

4 Rugged, welded steel body has smooth interior—reinforced at all stressed and wearing points—ribbed bottom cuts wear and facilitates digging.

5 Lip is heavy casting of wear-resistant manganese steel. Available for all size buckets with four or five teeth.

In designing the *Dragliner*, Daniels-Murtaugh engineers incorporated features that dragline operators have long wanted. *Dragliners* in use on coal and ore stripping operations and sand and gravel stripping and loading jobs have increased daily yardages and lowered costs on every yard handled.

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UNIVERSAL ENGINEERING CORP.

CEDAR RAPIDS, IOWA

"LOOK FOR THE ROUND BUMPER" D-M

DESIGNED AND ENGINEERED BY

DANIELS-MURTAUGH CO.

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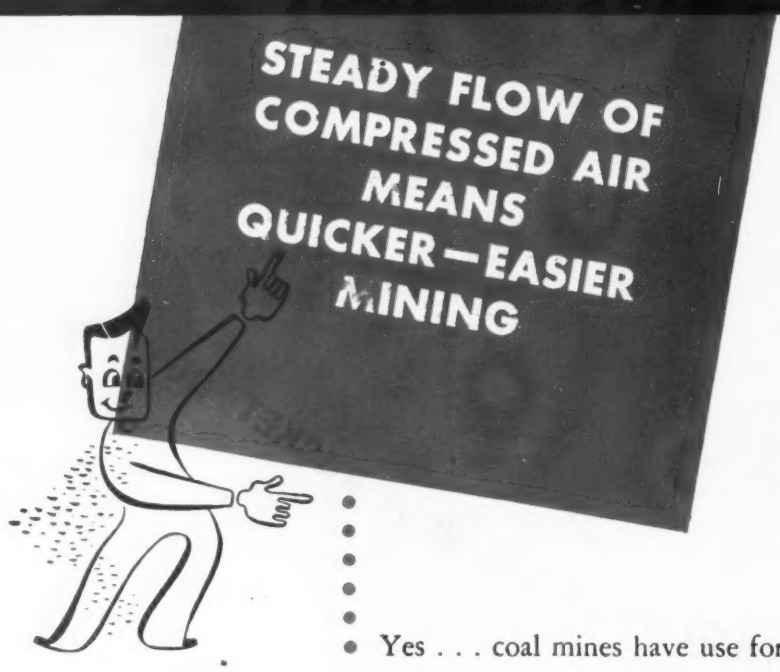

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You get these features in Schramm Compressors: (1) 100 water cooled to prevent freezing in winter or overheating in summer (2) mechanical intake valve operating from cam in perfect timing (3) larger discharge valve with lower lift, which adds to the efficiency (4) furnished either for belt drive or "built-in" motor drive, assembled rigidly and in perfect alignment. Write today for full details and descriptive leaflets.

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THE COMPRESSOR PEOPLE
WEST CHESTER
PENNSYLVANIA

Oldroyd Tipple Burns

Fire on Feb. 12 destroyed the tipple and hoisting machinery of the Oldroyd Coal Co. mine at Pana, Ill., formerly known as the Penwell mine, throwing about 160 miners out of work. Saying that the cause of the blaze had not been determined, L. H. Stone, mine manager, added that an unofficial estimate of the damage at $25,000 had not been verified.

•

Personal Notes

NOAH D. HOWARD, formerly chief engineer, Eastern Coal Corp., Stone, Ky., has been appointed manager of Hazard Splint Coal Co. and Premium Coals, Inc., Premium, Letcher County, Ky.

JAMES WALLACE SMELKER has been named to the staff of Battelle Memorial Institute, Columbus, Ohio, and assigned to its division of fuels research. A recent graduate of Ohio State University, he holds a bachelor's degree in mechanical engineering.

ARTHUR S. KNOIZEN, director of the War Production Board's Mining Division, will continue in that post despite previous announcement of his resignation. WPB Chairman Krug persuaded Mr. Knoizen to remain in charge indefinitely, spending six or eight days a month in Washington to direct policy matters and supervise the principal functions of the division. Dr. Marcellus H. Stow, who continues as deputy director of the Division, will be in charge in Mr. Knoizen's absence.

L. THAYER LYON, formerly vice president of the Reliance Coal Mining Co., Pittsburgh, Pa., has been elected president, vice John B. Moore, deceased. Other officers elected were JAMES G. MARKS, secretary; DAVID R. MORRIS, treasurer and assistant secretary, and E. E. BEARDSLEY, assistant treasurer.

JOHN D. COONER, assistant colliery superintendent, Olyphant colliery, The Hudson Coal Co., has been appointed safety engineer, vice W. C. Metzger, deceased. After his graduation from Penn State College and completing the Hudson students' course Mr. Cooner was appointed assistant mine foreman in 1917; subsequently engaged in mechanical mining work for the company; then became assistant to the chief engineer and safety inspector, being appointed assistant superintendent at Olyphant in 1939.

JOSEPH A. CORGAN has been appointed chief of the anthracite and coke section of the Economics and Statistics Service, U. S. Bureau of Mines. A graduate of Pennsylvania State College as mining engineer, he was engaged for about six years in anthracite sales activities for The Hudson Coal Co. Beginning in 1937 he was a combustion engineer for the District of Columbia, soon thereafter joining the Bituminous Coal Division, where he was employed until joining the Bureau of Mines in 1940.

F. C. NICHOLSON, chief electrical engineer, Glen Alden Coal Co., Scranton, Pa.,

WOOD SPECIALIZATION

Assures a shovel specially designed to meet the needs of specialized use!

The BIG FIST Coal Shovel is the product of a national organization devoted to the one aim of making the *finest* shovels that can be made.

Therefore the BIG FIST Coal Shovel, in both blade and handle, represents the most advanced and practical designing, the best manufacture, the most thorough and pains-taking inspection. Each and every shovel bearing this nationally famous label, has a life expectancy which far exceeds that of ordinary, run-of-the-mine coal shovels. BIG FIST Brand Coal Shovels are in both fact and reputation — "The Champion Coal Shovels of the Mines of America."

A National Organization *Specializing Exclusively* in Shovels, Spades and Scoops.

BIG FIST Coal Shovel with *Steel I-Beam handle Reinforcement.*

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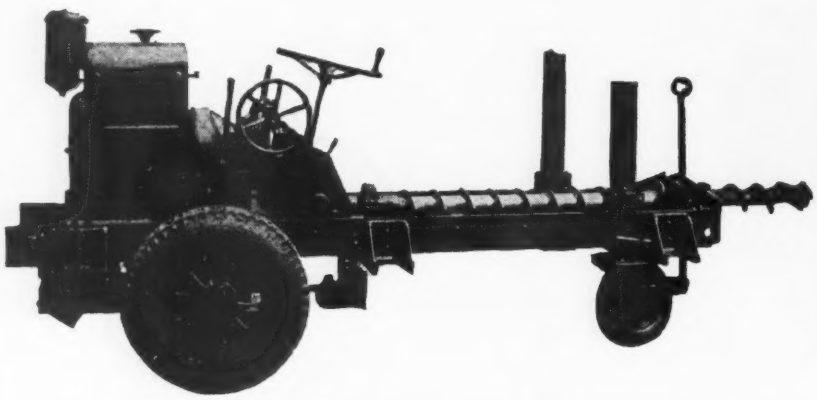
Parmanco Horizontal Drills give you "Positive Control Drilling." Parmanco Vertical and Horizontal Drills are today's leaders in low cost, low maintenance drilling—All Parmanco Drills are equipped with patented Parmanco augers. Used by leading strip mine operators—Write us your drilling problems.



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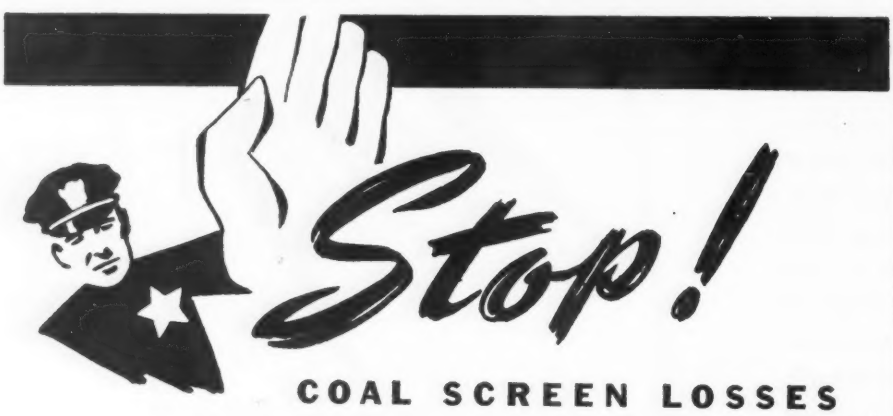
PARIS, ILLINOIS



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use **"BEE·ZEE"** *Round Rod* **SCREENS**

ALL TYPES SCREENS

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- Heat Dryer
- Hook-type Vibrator
- Shaker Panel
- Centrifugal Dryer
- Sizing Screen

For long life in dewatering, sizing and drying operations in coal preparation plants, "Bee-Zee" Round Rod Screens are the answer. Round-rod construction increases efficiency, lowers plant maintenance expense, assures more continuous operation. Bee-Zee Screens are manufactured for all types of coal preparation equipment. Our engineering service can help you—call on us today.

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F. C. Nicholson

has taken over the duties of the late Harry M. Warren, chief engineer. A graduate of Penn State with a B.S. degree in electrical engineering and from which he also received an E.E. degree, Mr. Nicholson took the Westinghouse training course and then spent two years with the Vulcan Iron Works. He started in electrical work in the coal industry in 1913 with the Lehigh & Wilkes-Barre Coal Co., was appointed electrical engineer in 1918 and served in that capacity through the merger with Glen Alden in 1930.

RAYMOND J. MORGAN, assistant colliery superintendent, Eddy Creek colliery, The Hudson Coal Co., has been moved to a similar post at the Olyphant colliery, vice John D. Cooner, transferred. Mr. Morgan started with the company in 1916 as a clerk. Deciding to enter the mines, he became a miner's laborer, advancing to mechanical mining work for several years, became a mine foreman in 1928 and assistant colliery superintendent in 1943.

HENRY H. NULL, inside foreman, Eddy Creek Colliery, The Hudson Coal Co., has been named assistant colliery superintendent, Eddy Creek colliery, vice R. J. Morgan, transferred. Educated at Lafayette, Franklin and Marshall and summer mining school at State College, Mr. Null worked in the western Pennsylvania bituminous field for a time, then took the Hudson students' training course and became section foreman in 1928, serving in that capacity in several of the company's operations before being appointed mine foreman in 1941.

JOHN L. AUCH, comptroller of the Pittsburgh Coal Co., has been elected vice president as well as comptroller. He succeeds ERNEST F. RUMPF, who resigned to become associated with Georgeson & Co., financial consultant, New York City. ARTHUR B. VAN BUSKIRK, vice president of the Mellon Securities Corp., was elected a director, vice the late J. B. L. Hornberger.

FRANK J. PETERNELL has been named safety engineer by the Union Pacific Coal Co., Rock Springs, Wyo., replacing R. R. KNILL, who resigned to take up new work.

HIGHLY PORTABLE

BIG CAPACITY

DIESEL POWERED

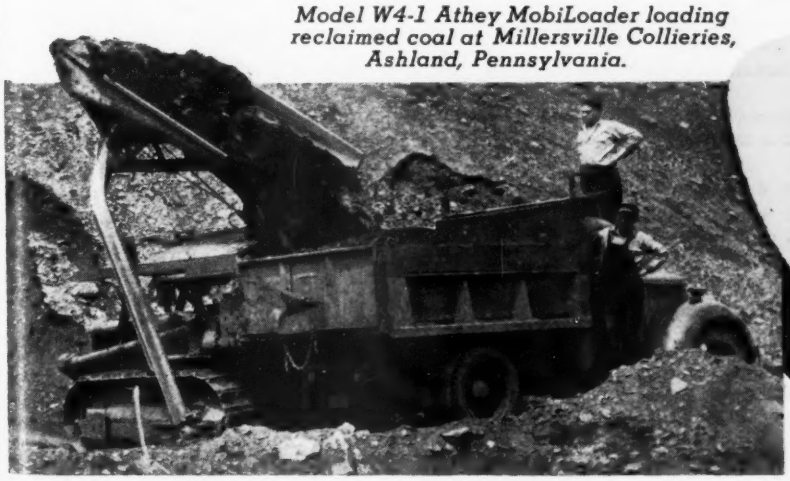
LOWER FIRST COST

The Mannix Construction Co. at Grassy Lake, Alberta, Canada is using a big-capacity Model 8 Athey MobiLoader, as shown above, to load coal on their mining operations. This was done without the need for shooting.

The MobiLoader's proven design and low cost operation has made it a useful loading tool on coal mining applications. The MobiLoader's outstanding features of portability, high production, diesel operating economy and lower initial investment, are attracting the attention of the coal industry. Using the overhead loading principle, the Athey MobiLoader loads at the front, carries the material in reverse, and discharges overhead into truck or railway car.

Your nearest Athey-"Caterpillar" Dealer will be glad to give you full details on Athey MobiLoaders, or write direct to Athey Truss Wheel Co., 5631 West 65th Street, Chicago 38, Illinois.

Model W4-1 Athey MobiLoader loading reclaimed coal at Millersville Collieries, Ashland, Pennsylvania.



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MOBILOADERS

DON'T MAKE THE MISTAKE OF THINKING ALL BEARING MATERIALS ARE ALIKE

As specialists in

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we can cut your maintenance costs. Specific formulae for each application permits our money-back guarantee of superior service. Parts for Jeffrey, Goodman, Westinghouse, General Electric, Sullivan, Joy Equipment, etc.

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will not cut, or stick to the shaft under ordinary operating conditions, will not powder under severe conditions and, in emergencies, can be run without lubrication even at red heat, then suddenly cooled and returned to service without the least injury to their properties. They can be machined at speeds of more than 500 feet per minute—more than double those of phosphor bronzes.

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PROMET BRONZE CASTINGS

of any size, shape or section, up to 5000 lbs. ea., to your own special patterns. Complete service including pattern making, designing, and machining when required. Estimates will be gladly furnished.

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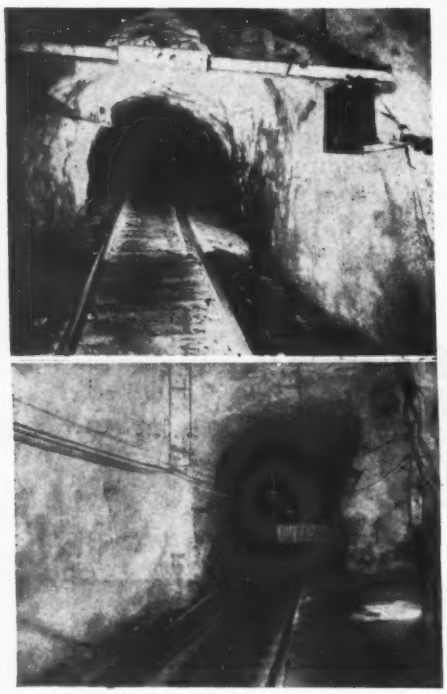
GENERAL OFFICES—ALLENTOWN, PENNA., U.S.A.



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Modern coal mines have used "GUNITE" for many years for lining the sides and roofs of haulageways, slopes, entries and underground rooms with resulting big savings in maintenance costs.

Summed up briefly, "GUNITE" offers the following:

1. Elimination of roof fall hazards, and attendant cleaning up.
2. Elimination of a great deal of timbering.
3. Additional head room, and better visibility due to the light colored "GUNITE" surface.
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6. Surface of "GUNITE" retains rock dust readily.
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We sell the equipment or we do the work by contract. Our bulletin 2200 gives more details. Write us for your copy.

MANUFACTURERS OF THE "CEMENT GUN"

EQUIPMENT APPROVALS

Four approvals of permissible equipment were issued by the U. S. Bureau of Mines in January, as follows:

Goodman Mfg. Co. — Type 75-EB04C storage-battery locomotive; Approval 1535; Jan. 5.

Brown-Fayro Co.—Type HP post puller; 230 and 550 volts, d.c.; Approvals 522 and 522A; Jan. 15.

Goodman Mfg. Co.—No 23817 distribution box; 440 volts, a.c.; Approval 523A; Jan. 20.

Goodman Mfg. Co.—Type 120 D.C. Conway shovel; Approval 524; Jan. 30.

Mr. Peternell has been with the company since 1935.

JOHN H. STANG, mechanical engineer, has been appointed to the staff of Battelle Memorial Institute, Columbus, Ohio, and assigned to its division of fuels research. A graduate of Ohio State University, he was formerly an assistant in the department of mechanical engineering of that school.

•

Preparation Facilities

PACIFIC COAL CO., Black Diamond Mine, Black Diamond, Wash.—Contract closed with McNally-Pittsburg Mfg. Corp. for McNally-Norton automatic washer to clean 50 t.p.h. of 0x3-in. raw coal; to replace existing facilities that have become obsolete and to be completed about May 1.

RALEIGH WYOMING MINING CO., Edwight Mine, Edwight, W. Va.—Contract closed with McNally-Pittsburg Mfg. Corp. for equipment to prescreen, wash and load 300 t.p.h. of 0x2- or 0x4-in. coal; 235 t.p.h. of 4x⅛-in. to be cleaned in a McNally-Norton automatic washer; equipment includes dewatering and sizing screens and crushing facilities together with mixing and loading equipment; water clarification cone equipped with vibrating type dewatering screens to recover minus 1-mm. sludge; this equipment is in addition to existing plant; to be completed about Aug. 15.

BUCKEYE COAL & COKE CO., Stephenson, W. Va.—Contract closed with Kanawha Mfg. Co. for Kanawha-Belknap washing plant consisting of two washers; capacity, 40 t.p.h. of 3x1¼-in. stove and 40 t.p.h. of 1¼x⅜-in. nut.

NAY AUG COAL CO., Dunmore, Pa.—Contract closed with Deister Concentrator Co. for one Concenco revolving feed distributor, heavy-duty type with eight-way distribution to handle No. 4 buckwheat coal for feed distribution to eight "Super-Duty Diagonal-Deck" No. 7 washing tables.

LECCONY SMOKELESS FUEL CO., Besoco, W. Va.—Contract closed with Kanawha

IT'S IN THE Bag

SEAL-TITE
SAFETY SEAM
TAMPING BAGS

• What's in a tamping bag is what counts. That's why SEAL-TITE Tamping Bags are your answer—they are built for your service so that you get a safer, faster, cheaper method of sealing shots.

Safety is built in because of the SEAL-TITE Safety Seam feature which prevents these bags from splitting or breaking as a result of moisture. You use less explosive thus avoiding shattering, heavy blasts which endanger mine roof and working structures.

There's economy in this bag too—it's made of 100% genuine sulphate kraft. That means greater strength and durability.

You reduce the number of charges—it means time savings. You increase the effectiveness of every charge.

Why not investigate today? Write to us and get all the details. Once you use SEAL-TITE Safety Seam Tamping Bags you'll see why so many operators prefer them and depend on them for best results. They can be supplied in any width—any desired length or weight of paper.

Ask about "The Dummy Maker" machine for use with SEAL-TITE Tamping Bags.

Relieves worry . . . assures better, safer working conditions . . . convenient . . . dependable . . . inexpensive . . . furnishes an ever-ready supply of safe, properly filled Dummies . . fills and packs 400 to 600 bags per hour . . . uses clay, rock dust, or sand . . . requires only one or two unskilled operators . . . operates on 1/4 h. p. motor from trolley circuit . . . mounted on trucks for portability . . . pays for itself in a short time.

THE TAMPING BAG COMPANY MOUNT VERNON, ILLINOIS

Lee-Norse "MINE JEEP"

A SPECIAL FIVE MAN VEHICLE FOR UNDERGROUND PERSONNEL TRANSPORTATION

Gets you there quicker--
without fatigue—
you can do a better job.

Used by

Mine Officials
Mine Inspectors
Mine Repairmen
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Visitors and Others

We completely overhaul and factory rebuild various kinds of mining machinery —cutters—loaders.

Phone us—Charleroi 750

Lee-Norse Company
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HERCULES AUGERS

Hercules Augers

Ideal for modern high speed electric drills—withstands whips and torsional strains. Flint hard and tough as wholebone. Drills faster—drills more holes with resharpening—outlasts four to five ordinary drills. Recommended for the hardest jobs. Up to 2" diameters—up to 16 ft. in length.

Black Diamond Augers

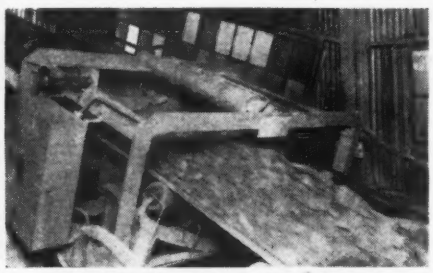
Carefully made from high-carbon crucible grade steel—heat-treated to obtain as much hardness and toughness as possible, to prevent broken tangs and points. Furnished up to 2" diameters—maximum over-all lengths 16 ft.

Standard Augers

Originally developed for use with hand drills. These augers work best at hand drilling drilling holes under stumps, and ditch blasting. Up to 2" diameters from oval steel 7/16" thick, and maximum length of ten ft.

Call on us for any type auger you may require in your operations. We specialize in manufacturing the better grade alloy, heat-treated augers. Write, wire or 'phone for details concerning sizes, prices, deliveries, etc.

SALEM TOOL COMPANY
SALEM OHIO



TRAMP IRON INSURANCE

DETECT tramp iron in coal. Dings Detectors signal the presence of iron and steel and will stop a belt so the metal may be removed. Detects the smallest objects over the entire belt width.

Write for data on Dings Detectors and High Intensity Magnetic Separators.

Dings Magnetic Separator Co.

506 E. Smith St. Milwaukee 7, Wis.

Dings MAGNETIC SEPARATION HIGH INTENSITY

Mfg. Co. for Kanawha-Belknap washing plant; capacity, 40 t.p.h. of 6x3-in. egg.

West Gulf Coal Co., Maben, W. Va. —Contract closed with Kanawha Mfg. Co. for washery for 5x⅜-in. coal; capacity, 85 t.p.h.; includes Jeffrey single-compartment diaphragm jig, Allis-Chalmers Ripl-flo vibrator to dewater and size and settling-tank clarification system.

Hillside Coal Co., Tamaqua, Pa.— Contract closed with Deister Concentrator Co. for one "SuperDuty Diagonal-Deck" washing table to handle barley size coal.

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Completing the Record

The tabulation of "New Bituminous Preparation Facilities in 1944," in our February issue, pp. 102-3, was incomplete, failing to include the following:

D & F Coal Co., Minersville, Pa.—One 15-ft.-diameter Chance cone and appurtenances; feed capacity, 300 t.p.h.

Northwest Coal Co., Raymond Shaft Breaker, Eynon, Pa.—One 12-ft.-diameter Chance cone and appurtenances; feed capacity, 200 t.p.h.

Stevens Coal Co., Westwood Breaker, Tremont, Pa.—One 15-ft.-diameter Chance cone and appurtenances; feed capacity, 300 t.p.h.

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American By-Product Coke Institute Formed

The American By-Product Coke Institute has been formed, with the following officers: president, Leigh Willard, president, Interlake Iron Corp., Cleveland, Ohio; vice president, William H. Earle, president, Philadelphia Coke Co., Philadelphia, Pa.; secretary, Alfred Hirsh, vice president, Laclede Gas Light Co., St. Louis, Mo. Headquarters will be established in Washington, D. C., and Samuel Weiss, who recently resigned as chief of Fuel Section, Steel Division, War Production Board, and chief of coke distribution, Solid Fuels Administration for War, will be executive secretary.

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Association Activities

Operators' Association of the Williamson Field has reelected the following officers: president, L. E. Woods; vice president, C. A. Hamill; treasurer, J. D. McLaughlin; secretary, Joseph J. Ardigo. Board of directors includes Landon C. Bell, J. E. Biggs Jr., O. W. Evans, W. S. Leckie, F. L. Long, J. W. Strickler, Laurence E. Tierney and Wade W. Walker.

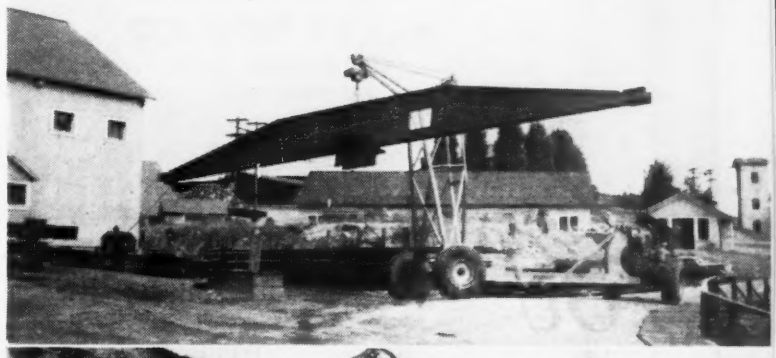
Big Sandy-Elkhorn Mining Institute has elected as president V. D. Picklesimer, general manager, South-East Coal Co., Seco, Ky. Other officers named were: vice presidents, Edgar Dale, superintendent, No. 28 mine, Elk Horn Coal Corp., Wayland, Ky.; M. M. McCormick, superintendent, No. 155 mine, Consolidation Coal Co., Van Lear, Ky., and Arthur Bradbury, Inland Steel Co., Wheelwright, Ky.; secretary, A. D. Sisk.

HOW FAST-MOVING TOURNAPULLS CAN LOWER YOUR *Mining Costs*

BIG PNEUMATIC-TIRED TOURNAPULLS TRAVEL AT SPEEDS UP TO 14.9 M.P.H. . . . OFFER YOU MONEY-SAVING INTER-CHANGEABILITY TO SPEED PRODUCTION ON ALL THESE MINING JOBS . . .

STRIP OVERBURDEN

with LeTourneau 15-Yd. LP Carryall Scraper—This is one of your most profitable Tournapull mining uses, because you get LeTourneau Carryall Scraper stripping economies on truck haul distances. Like all big-capacity scrapers, Tournapullls are designed for pusher loading. They load quickly, haul and spread their own loads, are one-man operated. Will handle overburden of any depth, fit need for low-equipment investment in small tonnage mines. But Tournapull savings don't stop here. In addition you can . . .



LIFT AND CARRY HEAVY LOADS

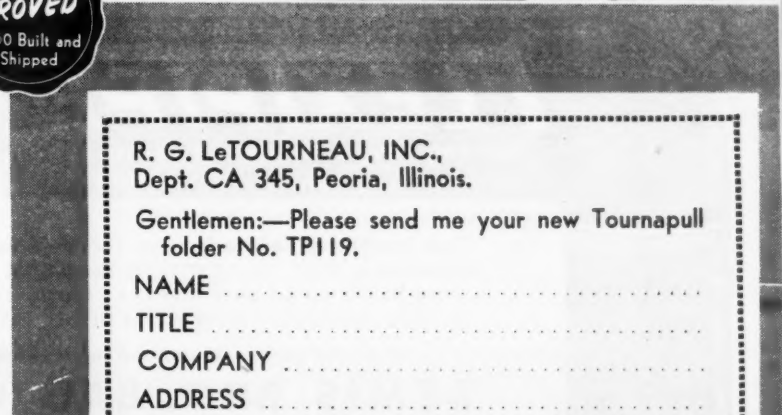
with Tournacranes — LeTourneau rubber-tired Tournacranes, with Super C Tournapull, give you lifting capacities up to 50,000 lbs; 8 to 21-foot reach (in upright position); 20 to 40-foot lift. With them you can travel, carrying maximum loads, to: load and unload supplies, erect structural forms, assemble heavy machinery and lift and carry heavy loads over pavement or across rail lines without planking. You can also use same Tournapull prime mover for . . .

HIGH-SPEED HAULING

with Tournatrailers— 17-yard rear-dump Tournatrailers quickly convert Tournapulls into high-speed hauling units. They're built for loading by shovel or dragline to haul blasted rock or "soupy" overburden not suitable for scraper stripping. All three — Carryall, Tournacrane and Tournatrailer—are operated by cable from standard LeTourneau 2-drum Power Unit . . . and are quickly and easily interchangeable, to distribute intial cost of the Tournapull prime mover over many mining and materials handling jobs . . . thus, lower your cost.

PLAN NOW TO USE TOURNAPULLS

You'll pay less, move more yardage at lower net cost . . . and handle more mining jobs with fewer units and men. It will pay you to check further on Tournapull profit possibilities . . . send *today* for your copy of factual 8-page folder on "The Trend to Rubber-Tired Power". CM2



JOB-PROVED
2750 Built and Shipped

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PEORIA, ILLINOIS • STOCKTON, CALIFORNIA

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(Trade Mark Reg. U. S. Pat. Off.)

R. G. LeTOURNEAU, INC.,
Dept. CA 345, Peoria, Illinois.

Gentlemen:—Please send me your new Tournapull folder No. TP119.

NAME .....
TITLE .....
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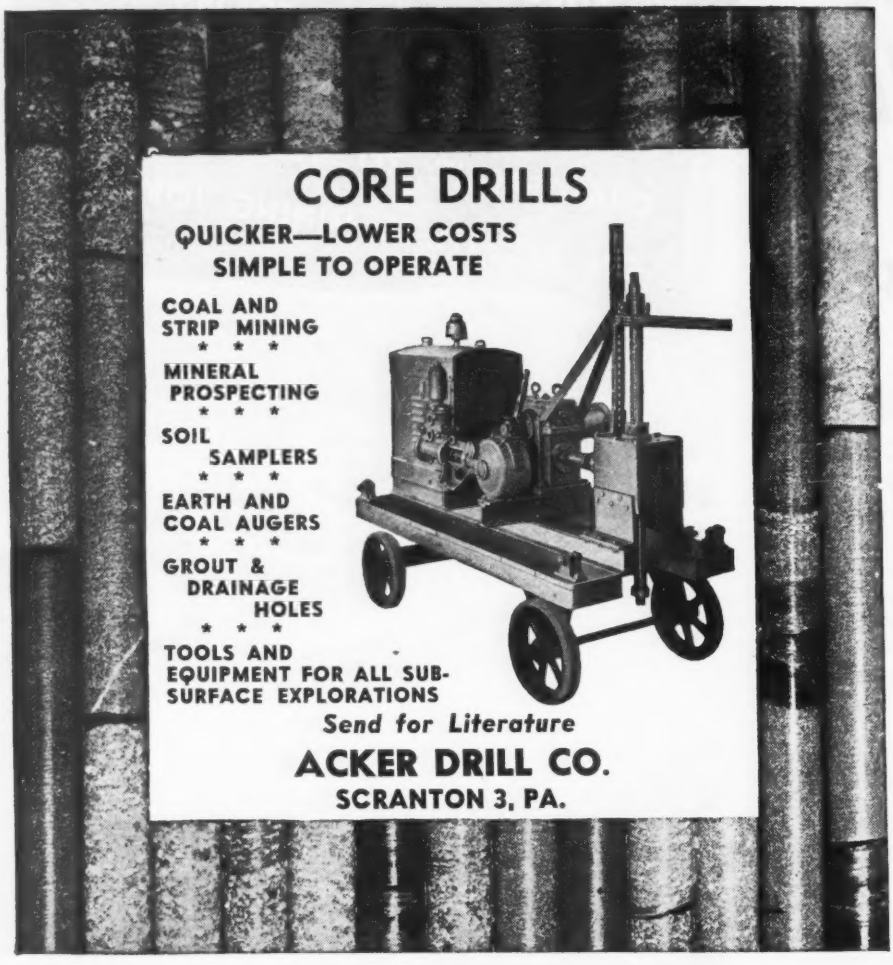
RUBBER-TIRED POWER FOR FASTER EARTHMOVING



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of more than 12,000 subscribers of COAL AGE.

Your problems of mine management, production and maintenance—business or individual — are duplicated with *other* readers BUT —

Still *OTHER* readers can provide the solution of your problem if they *know what it is!*

Tell them through classified advertising in the Searchlight Section of "Coal Age" —*your* business paper and *theirs.*

FLEXIPIPE

The improved flexible tubing for mine and tunnel ventilation

This flexible air tubing is ready for immediate, easy installation. With our NEW ROPE SEAM SUSPENSION it can be put up or taken down in a fractional part of the time required by other means of face ventilation.

Write for free sample and full information.

BEMIS BRO. BAG CO.
ST. LOUIS, MO.

Mahan-Cheely and Mahan-Ellison Merge

Mahan-Cheely Coal Co. and the Mahan-Ellison Coal Corp. have been merged, with the following officers: B. E. Cheely, chairman of the board; J. A. Dickinson, president; C. R. Griffith, vice president; T. J. Roberts, secretary, and A. M. Ellison, treasurer. General offices are at Williamsburg, Ky., and mines at Liggett, Ky., and Lancing, Tenn.

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Obituary

A. Brooks Fleming Jr., '62, long an official of the Consolidation Coal Co., died Feb. 7 at his Fairmont (W. Va.) home after an illness of four months. Attending West Virginia University Law School and Princeton University, he worked as a clerk in a company store during his vacations. In 1905 he joined the old Fairmont Coal Co., later consolidated with other firms to form the Consolidation Coal Co., with which he was associated the rest of his life. In recent years he was director of the company's employment service.

Douglas Gorman, 62, president of the Cumberland Coal Co., operating in Tucker County, West Virginia, died Jan. 29 at his home in Baltimore. Besides heading the coal producing company for 20 years he also operated large retail yard distribution in Baltimore. He was one of the organizers of Bituminous Coal Research, Inc., and until recent years, when his health restricted his business activities, he was on several National Coal Association committees.

William G. Metzger, 65, associated with The Hudson Coal Co., Scranton, Pa., for nearly a quarter century in safety work, in which he gained national reputation, died Feb. 16 at his home in Scranton following a short illness. He served nearly 20 years in the bituminous field before joining Hudson in 1922. He also was editor of *The Safety Commentator,* Hudson's monthly publication. At one time he was chairman of the mining section of the National Safety Congress.

William G. Metzger

means EVERYTHING on the job

Yes, everything you want in a truck you get in the 1945 model heavy-duty CHEVROLET

TODAY'S TRUCKS— designed to meet Today's Rigorous Requirements

Essential users qualified to purchase new trucks are urged to place their orders promptly. See your Chevrolet dealer now!

BUY MORE WAR BONDS—HELP SPEED THE VICTORY

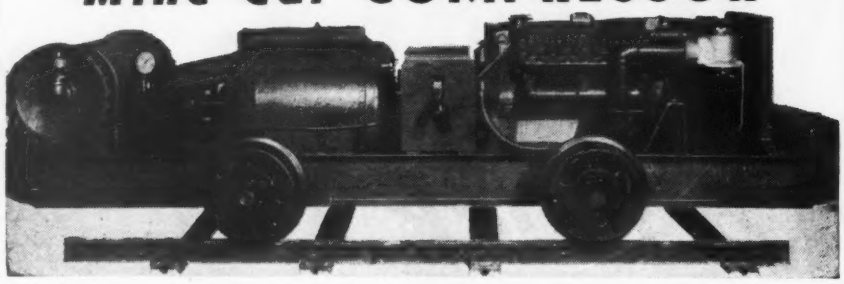
POWER. *Every* 1945 model heavy-duty Chevrolet truck is powered by the high-torque Load-Master engine—designed and built for truck use exclusively. Here is an engine that can exert its maximum pulling power at low engine speed (1000 to 1900 r.p.m.) and over a wide range of road speeds (from 2 m.p.h. in low gear to 32 m.p.h. in high, with single-speed rear axle).

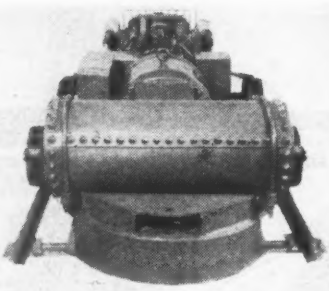
EQUIPMENT. *Every* 1945 model heavy-duty Chevrolet truck carries many items of equipment that increase efficiency and reliability—including oil-bath air cleaner, heavy-duty extra-capacity radiator, 10-leaf rear springs with special auxiliary (helper) springs, and side-member plates on chassis frame. All models have dual rear wheels. Special heavy-duty front springs and special axles are obtainable in numerous combinations. Of the seven chassis combinations, two are equipped with special extra-capacity single-speed rear axle, three with two-speed rear axle. A special oversize front axle (4500-pound rating) is used in the heaviest truck of each wheelbase—134½ and 160 inches.

ONE OUT OF EVERY THREE TRUCKS IS A CHEVROLET

CHEVROLET MOTOR DIVISION, General Motors Corporation, DETROIT 2, MICHIGAN

ACME "LOWBOY" Mine Car COMPRESSOR





REAR VIEW OF COMPRESSOR

Above view shows location of air receiver which is A.S.M.E. riveted type. Each end of outfit is provided with coupling for towing.

• A lightweight — compact — low height mine car compressor which delivers 92 cu. ft. of air per minute at 100 lb. pressure. The unit is driven by a 25 HP compound wound motor. Operating speed 1140 R.P.M.—voltage either 230 or 500 D.C.

The Acme "Lowboy" is specifically designed to meet the needs of present day mining especially mechanized properties. Being low in height it is adaptable to both high and low seam operations.

Bulletin No. 3920 gives complete description of unit and its many advantages in modern mining. Write for your copy today.

ACME COMPRESSOR CO.
Williamson, West Virginia

The Searchlight Section of Coal Age

features Employment, Equipment and Business Opportunities identified with the mining of coal.

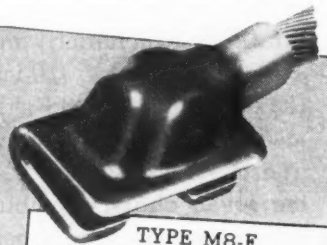
"Searchlight" ads are referred to regularly by readers interested in such "Opportunities."

You can therefore bring "Opportunities" you have to offer to the attention of these readers quickly, and at small cost, through an advertisement in the Searchlight Section. (See pages 188-193.)

mosebach
for a complete stock of RAIL BONDS

Mosebach stocks 18 different styles of patented Electric Flashwelded Bonds. When you make Mosebach your rail bond headquarters, you are assured the proper bond for every use.

WRITE FOR CATALOG No. 44
OR PHONE HEMLOCK 8332



TYPE M8-F
This separate Joint Bond permits straight line welding. The extra terminal pocket increases the welding area about 15% and lowers resistance.

MOSEBACH
ELECTRIC & SUPPLY CO., 110 ARLINGTON AVE., PITTSBURGH, PA.

Harry M. Warren

HARRY M. WARREN, 69, chief engineer of the Glen Alden Coal Co., died Feb. 3 at his home in Scranton, Pa., following an illness of five weeks. Serving as electrical engineer for the Lackawanna R.R. and its coal mining department, on the segregation of its mining properties in 1921 he became consulting engineer for the Glen Alden Coal Co. and the railroad. In 1932 he was named chief engineer of the Glen Alden company and also become electrical engineer of the Keystone Mining Co.

He was a member of a commission named by President Theodore Roosevelt to study mining in Europe. He also served on the U. S. Fuel Administration in World War I. He pioneered in the introduction of the use of electricity in mining anthracite and was prominently identified with the development of the use of fine size anthracite for power production.

LYLE H. DAYHOFF, 59, chairman of the board of the Republic Coal & Coke Co., Chicago selling organization, died Feb. 17 in Miami, Fla., of a heart attack. His connection with the coal industry began in 1901 with the Jones & Adams Co., which later became part of the Pittsburgh Coal Co. With Harold D. Wright, he founded the Republic organization in 1919.

OSCAR STINSON, 60, foreman at Enos mine of the Enos Coal Mining Co., Oakland City, Ind., died Feb. 21 at his home near Petersburg, Ind.

R. D. PATTERSON, president, Weyanoke Coal & Coke Co., operating in the Pocahontas field of West Virginia, died Feb. 23 in Miami, Fla. He also was president of the S. J. Patterson Co., a large selling company founded in 1872.

•

Coal Mine Fatalities Continue Uptrend

Accidents of coal mines of the United States caused the deaths of 77 bituminous and 13 anthracite miners in December last, according to reports furnished the U. S. Bureau of Mines by State mine inspectors.

With this New Clutch
YOU CAN SAVE

1. Space
2. Maintenance
3. Repair Cost
4. TIME

The FAWICK Airflex Clutch

1. Saves Space because it is compact and requires no springs, arms or toggles. It controls power by air.
2. Saves Maintenance because it requires no adjustments, no lubrication. Even corrects automatically for misalignment.
3. Saves Repair Costs because there are no parts to break or wear out. Has torsional flexibility—absorbs shocks and vibration.
4. Saves TIME because it permits dependable *full-time* operation, in the heaviest service.

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The Fawick Airflex Clutch has proved its performance in hundreds of Naval vessels under combat conditions—and for heavy-duty drives throughout industry.

Ask our Engineering Department for recommendations.

FAWICK AIRFLEX COMPANY, INC. • 9919 Clinton Rd., Cleveland 11, Ohio

In Canada, Renold-Coventry Ltd., Montreal, Toronto, Vancouver

In Britain, Crofts Engineers, Ltd., Bradford, England

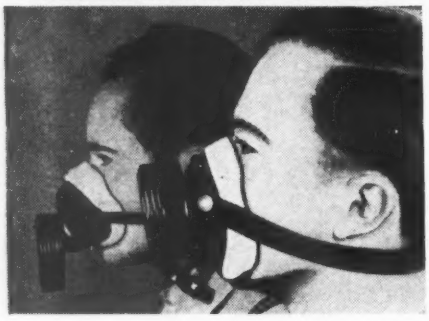
FAWICK *Airflex* CLUTCH

POWER CONTROLLED BY AIR

SIMPLE

WILLSON No. 5 and 45 Lightweight Respirators with easily replaceable filters protect workers. They remove harmful dusts and mists. Bureau of Mines Approvals for various hazards. Filters tested for low breathing resistance.

SAFE



Two sizes for wide range of faces assure safety of a good fit. Form molded rubber facepiece prevents leakage at edges. Adjustable headband and nose spring maintain tight seal.

COMFORTABLE

Comfort features of WILLSON Respirators make them easy to wear. Their light weight requires little headband pressure. Compactness permits full vision—safety goggles can be worn. Washable cotton FACELET* protects face.

*Trade Mark Reg. U. S. Pat. Off.

Get in touch with your WILLSON Safety Service Distributor for full information. Or write Dept. CA-6.

GOGGLES • RESPIRATORS • GAS MASKS • HELMETS

DOUBLE WILLSON

PRODUCTS INCORPORATED
READING PA U S A

With a production of 44,829,000 net tons, the accident death rate among bituminous miners in December last was 1.72 per million tons, compared with 1.63 (revised) in the preceding month and 1.59 in December, 1943.

The anthracite fatality rate from accidents in December was 2.84, based on an output of 4,570,000 tons, against 2.95 (revised) in the preceding month and 2.24 in the last month of 1943.

For the two industries combined, the accident fatality rate in December last was 1.82, compared with 1.65 in the preceding month and 1.64 a year earlier.

Fatalities during December and earlier months, by causes and states, were as follows:

AVERAGE NUMBER OF MEN KILLED PER MILLION NET TONS OF COAL PRODUCED IN THE UNITED STATES IN DEC. 1944, AND IN EARLIER PERIODS, BY CAUSES OF ACCIDENTS [1]

BITUMINOUS

Cause	Percent of Total	1934–43 (average)	Fatality Rates per Million Net Tons					November 1944 Revised
			12 months		December			
			1942	1943	1934–43 (average)	1943	1944	
Underground:								
Falls of roof and coal	52.0	1.242	1.015	1.056	1.283	.812	.781	.874
Haulage	18.4	.438	.417	.398	.438	.424	.513	.397
Gas or dust explosions:								
Local	1.9	.045	.034	.037	.067	.....	.067	.....
Major	7.9	.188	.218	.251	.040	.....	.....	.....
Explosives	2.3	.055	.029	.047	.045	.307	.045	.020
Electricity	4.1	.097	.088	.053	.086	.018	.045	.060
Machinery	3.3	.078	.084	.046	.081	.018	.089	.139
Shaft	0.9	.022	.010	.014	.031	.018	.....	.....
Miscellaneous	2.8	.068	.065	.064	.050	.056	.022	.020
Total underground	93.6	2.233	1.960	1.966	2.121	1.383	1.562	1.510
Stripping or opencut	11.7	.041	.053	.041	.057	.055	.089	.040
Surface	4.7	.112	.122	.101	.129	.148	.067	.080
Grand Total	100.0	2.386	2.135	2.108	2.307	1.586	1.718	1.630

ANTHRACITE

Underground:								
Falls of roof and coal	54.5	2.299	2.264	1.999	2.138	1.632	1.094	1.376
Haulage	13.3	.562	.634	.639	.436	.204	.875	.393
Gas or dust explosions:								
Local	2.7	.114	.154	.017	.044	.....	.....	.....
Major	2.2	.093	.....	.235	.....	.....	.....	.....
Explosives	6.1	.257	.223	.151	.218	.....	.....	.196
Electricity	1.8	.074	.103	.017	.044	.....	.....	.....
Machinery	0.7	.030	.017	.017	.022	.....	.....	.....
Shaft	2.0	.084	.017	.017	.022	.....	.219	.....
Miscellaneous	6.2	.264	.189	.185	.240	.204	.219	.590
Total underground	89.5	3.777	3.601	3.277	3.164	2.040	2.407	2.555
Stripping or opencut	3.3	.138	.069	.168	.153	.....	.....	.....
Surface	7.2	.305	.205	.353	.283	.204	.438	.393
Grand Total	100.0	4.220	3.875	3.798	3.600	2.244	2.845	2.948

[1] All figures are subject to revision.

U. S. COAL-MINE FATALITIES IN 1944, BY STATES AND MONTHS [1]

State	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Alabama	1	6	2	5	2	4	4	4	...	5	4	4	41
Alaska	...	...	...	...	...	...	...	...	...	...	...	...	.....
Arkansas	...	...	...	...	1	3	...	1	1	1	...	...	7
Colorado	3	4	3	...	1	...	1	3	3	...	3	...	21
Illinois	7	6	5	5	5	7	17	6	10	7	5	5	85
Indiana	...	2	2	...	1	3	1	4	2	1	3	2	21
Iowa	1	...	1	1	...	...	...	...	1	...	...	1	5
Kansas	1	...	...	1	...	...	...	...	1	1	...	...	4
Kentucky	11	9	12	5	12	15	18	13	15	13	15	16	154
Maryland	...	...	1	...	...	2	1	...	...	1	...	1	6
Michigan	...	...	...	...	...	...	...	...	...	...	1	...	1
Missouri	...	...	...	...	...	...	1	...	1	...	2	...	4
Montana	...	...	1	...	1	...	...	...	...	1	...	...	3
New Mexico	1	...	...	...	...	...	6	3	1	...	1	...	12
North Dakota	1	...	1	...	...	...	...	...	...	1	2	...	5
Ohio	6	5	5	6	5	2	71	5	1	4	1	2	113
Oklahoma	3	...	...	...	4	...	6	1	2	...	...	...	16
Penna. (bit.)	12	10	22	14	11	23	17	7	16	9	13	13	167
South Dakota	...	...	...	...	...	...	...	...	...	...	...	...	.....
Tennessee	1	1	2	...	2	3	1	1	2	1	...	...	14
Texas	...	...	...	...	...	...	...	...	...	...	...	...	.....
Utah	3	3	1	3	3	...	...	2	...	2	...	2	19
Virginia	6	4	4	5	2	1	5	2	3	5	4	5	46
Washington	...	...	...	...	...	...	...	...	...	...	1	...	1
West Virginia	29	20	39	20	37	17	16	25	25	29	26	26	309
Wyoming	1	1	2	1	1	1	1	5	2	1	1	...	17
Total bituminous	87	71	103	66	88	81	166	82	86	82	82	77	1071
Penna. anthracite	14	21	22	5	14	11	12	14	15	12	15	13	168
Grand total 1944	101	92	125	71	102	92	178	96	101	94	97	90	1239
Grand total 1943[2]	117	191	131	118	136	94	133	138	136	90	99	91	1474

[1] Figures are subject to revision, as some serious injuries during the month may prove fatal in a later month. Slight differences, if any, between accident figures published by the Bureau of Mines and those published by the mine officials of some States are due to differences in defining a mine accident or to variations in classes of mines canvassed.

[2] Figures for 1943 are based on an estimate of what final figures will show.

RUBBER is vital for Industry to keep the War machine moving

All of us should keep our eyes on the ultimate goal, to that time when the civilian trade can be supplied with all the Industrial Rubber Products they need.

Some reverses have been experienced in the War progress, which none of us like. But it is a case of everybody setting their jaws and performing their assigned tasks to make final victory that much sooner.

Quaker is producing at maximum capacity. Millions of feet of belting and hose together with tons of rod and sheet packings are going to help keep the war machine in operation—you would not want it otherwise, even though it deprives you of much longed for stock.

All orders for the Army, Navy, Air Forces, are being rushed to completion. We are serving industrial and civilian uses to our best ability under the present circumstances.

Though the exact product you want may not be available, Quaker can offer and suggest what can be used during the present emergency.

Quaker is at your service to help you whenever industrial rubber goods are involved. For sixty years Quaker has been manufacturing Quality Industrial Rubber Products . . . Belting—Hose —Packings—and Moulded Parts. Regardless of what your rubber problem may be, feel free to consult with us.

"If there is a way to get it done—Quaker will do it"

QUAKER RUBBER CORPORATION

Mfrs. Industrial Rubber Products

PHILADELPHIA 24, PA.

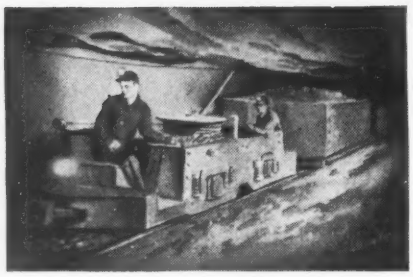
NEW YORK 7 — CHICAGO 16

CLEVELAND 15 — HOUSTON 1

Western Territory:

QUAKER PACIFIC RUBBER COMPANY

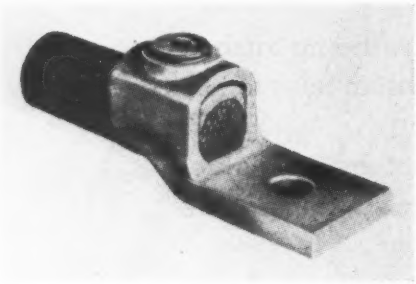
SAN FRANCISCO 5 • LOS ANGELES 21



Equipment News

Connector Lug

A solderless lug that will accommodate more than one size of wire is offered by the O. Z. Electrical Mfg. Co., Brooklyn, N. Y. Type XL lug, made of cast copper alloy, is so designed, it is said, that high clamping pressure is exerted by the pressure plate, insuring high conductivity on any one of the wires in a wide range of



sizes. Socket wrenches are furnished without cost. Catalog illustrates and describes conduit fittings, cable terminators, junction boxes, solderless connectors, power connectors and grounding devices.

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Conveyor Belts

Longer life for rubber-fabric conveyor belts subjected to severe operating conditions is forecast by the manufacturer for Neoprene-coated Fiberglas fabric belts made by the B, F. Goodrich Co., Akron, Ohio, as the result of tests on a factory conveyor line operating on a continuous 24-hour 7-days-a-week schedule. Temperature of the material carried by the belts averages 300 deg. F. The belts are subjected to considerable flexing and are exposed to contact with oil used in the binder of the material carried. Average life of rubber-covered cotton belts exposed to these conditions has been six weeks.

Eight Neoprene-Fiberglas belts $\frac{1}{8}$ in. thick and 4 in. wide were installed on the conveyor line. One belt was burned through by a piece of red-hot material after three months' service. A second unit failed at the end of six months because of extreme stress at a time of operating difficulty. At the end of seven months' service, the other six belts were still performing efficiently.

In fabricating the Neoprene-Fiberglas belts two inner plies and two outer plies of Fiberglas cloth 36 in. wide were given a thin coat of Neoprene and then calendered to obtain the required thickness of coating. The coated, uncured plies were assembled; the Neoprene cover was applied. The entire assembly was then press-cured and cut to required lengths and widths.

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Industrial Notes

Osmiose Wood Preserving Co. of America, Inc., announces that its Chicago office, formerly at 14 East Jackson Blvd., now is in new quarters at Room 922, 322 South Michigan Ave. The Denver office, until recently at 821 E. & C. Building, now is at Tower No. 2, Continental Oil Building.

Calcium Chloride Association, Detroit, Mich., has appointed William A. Stabb, mining engineer and former professor in West Virginia University, as engineer representative.

B. F. Goodrich Co. and Firestone Tire & Rubber Co., Akron, Ohio, have purchased basic patents covering electronic vulcanization of rubber and other materials. The patents originally were granted on discoveries made by R. A. Dufour and H. A. Leduc, of France, and E. E. W. Kassner, of Switzerland.

Elmer C. Hill, until recently with the War Production Board, has been appointed general manager of the Chicago branch of Holcomb & Hoke Mfg. Co., Indianapolis, a pioneer in the coal stoker field.

Wood Shovel & Tool Co., Piqua, Ohio, has appointed Ernest H. Branning as general manager.

General Electric Co., Schenectady, N. Y., has elected Ralph J. Cordinier as vice president and assistant to the president.

Wickwire Spencer Steel Co., 500 Fifth Ave., New York 18, N. Y., has appointed A. S. Rairden as sales manager of its wire rope division. Formerly with Carnegie Illinois, American Steel & Wire and American Chain & Cable, he also was associated with Wickwire Spencer as sales engineer and wire rope sales manager.

Okonite Co. has appointed A. L. McNeill as manager, Chicago district, directing insulated wire and cable sales from Ohio to the Rocky Mountains. E. H. McNeill, formerly manager of the power and light department, has been appointed assistant manager, Chicago district, and Harry D. Pierce has been made office sales manager.

Duraloy Co., Scottdale, Pa., has purchased from the United States Pipe & Foundry Co., Burlington, N. J., its interest in the Duraloy Co. New officers of Duraloy are: T. R. Hayward, Jr., president; W. F. Furman, vice president in charge of operations; H. T. Harrison, vice president in charge of sales; J. J. Baum, plant superintendent. Directors include: Messrs. Hayward, Furman, Harrison, W. L. King and F. S. Wynans.

Goodyear Tire & Rubber Co., Akron, Ohio, has appointed R. G. Pauley as district manager in Pittsburgh of the company's mechanical goods division.

Ohio Brass Co., Mansfield, Ohio, has moved its San Francisco office to 1503 Hobart Building, 582 Market St. This office is under the direction of A. M. Bohnert.

Barber-Greene Co., Aurora, Ill., announces that Lt. Col. C. B. (Cliff) Gould, for many years manager of its Detroit office, has resumed his old job, with headquarters at 25 East Seven Mile Road, following his release from the Army Air Corps. Appointments of representatives in the construction and industrial divisions include: Kentucky—Brandeis Machinery & Supply Co., Brook and Warner Sts., Louisville 8; western Michigan—Parmenter & Andre, 200 Ionia Ave., N. W., Grand Rapids; western Ohio and southeastern Indiana—Carroll-Edwards & Co., 6508 Montgomery Road, Cincinnati.

Allis-Chalmers Mfg. Co., Milwaukee, Wis., has appointed U. E. Sandelin as manager of its Seattle district office, succeeding A. J. Schmitz, who has been named Pacific regional manager, with headquarters in San Francisco.

Airtemp Division of Chrysler Corp. has purchased certain assets of the Stokol Division of the Schwitzer-Cummins Co., Indianapolis, Ind., and will use its machinery, tools and inventory to produce Stokol stokers and other equipment. Airtemp has its main plant and headquarters at Dayton, Ohio. The new company has been named Stokol Stoker Co., Inc., and will continue to merchandise Stokol stokers. J. A. McDaniel, sales manager for the Stokol Division, has been appointed vice president and general manager.

Stearns Magnetic Mfg. Co. has appointed as regional sales representative

J&L J&L PERMASET PRECISIONBILT PRE-FORMED WIRE ROPE • J&L PERMASET PRECISIONBILT PRE-FORMED WIRE ROPE J&L COAL

J&L PERMASET PRECISIONBILT PRE-FORMED WIRE ROPE

J&L PERMASET WIRE ROPE

Precisionbilt to Protect Life • Equipment • Operations • Periscopes are built with precision. So is J&L Wire Rope. Safety of human life . . . protection of equipment . . . maintenance of operations . . . depend on the quality of the wire rope you use. To give you the greatest protection . . . J&L builds wire rope with precision . . . from J&L Controlled Quality Steel . . . by men of skill and experience . . . on machines of the latest design . . . and pre-forms it for greater efficiency and resistance to fatigue.

J&L STEEL

JONES & LAUGHLIN STEEL CORPORATION

GILMORE WIRE ROPE DIVISION

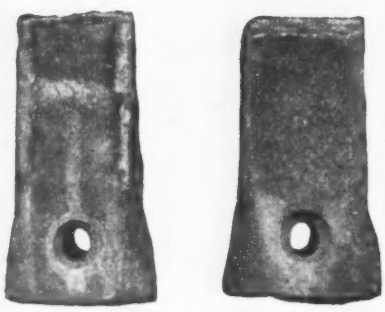
PITTSBURGH 30, AND MUNCY, PENNSYLVANIA

J&L PERMASET PRECISIONBILT PRE-FORMED WIRE ROPE

J&L PERMASET PRECISIONBILT PRE-FORMED WIRE ROPE • J&L PERMASET PRECISIONBILT PRE-FORMED WIRE ROPE • J&L PERMASET PRECISIONBILT PRE-FORMED WIRE ROPE • J&L PERMASET PRECISIONBILT PRE-FORMED WIRE ROPE

Bucket teeth Veterans

NOW FULL OF YOUTH!



GOOD AS NEW! That's what you'd say about these worn drag line bucket teeth after they had been salvaged with Coast Metals Hard-Facing! In fact, they are now *better than new.* Because Coast Metals Hard-Facing makes them extra-resistant to abrasion and wear, they will outlast and outwear ordinary teeth several times.

A trial will convince you that Coast Metals Hard-Facing can't be equalled for keeping equipment constantly on the job without unnecessary time out for repairs or replacements. Application is simple—either by the electric welding arc or the oxy-acetylene torch—to new or worn shovel and bucket teeth, lips and other equipment of any ferrous metal, including manganese steel, alloy steel, cast iron and chilled iron.

Tell us your wear-resistance problem. Coast Metals Hard-Facing can help you make your equipment last longer.

COAST METALS, INC.
Plant and General Offices: Canton, Ohio
Executive Offices: New York 19, N.Y.

COAST METALS
hard-facing weld rods
MAKE YOUR EQUIPMENT LAST LONGER

John D. Homan, 714 South Orleans Ave., Tampa 6, Fla.

PENNSYLVANIA ELECTRIC COIL CO., 1301 Sawmill Run, Pittsburgh, Pa., has appointed D. A. Marshall, 1842 Enslow Blvd., Huntington, W. Va., as distributor for its armature and field coils in the southern Appalachian district.

PHILLIPS MILL & MINE SUPPLY CO., Pittsburgh, Pa., announces the appointment, effective April 1, of D. A. Marshall, 1842 Enslow Blvd., Huntington, W. Va., as distributor for all its products in the southern Appalachian area.

AMERICAN CAR & FOUNDRY CO. has appointed H. V. Ennis as assistant to J. A. V. Scheckenbach, vice president—manufacturing.

AMERICAN CHAIN & CABLE CO. has appointed Alton Parker Hall as general manager of sales, with headquarters at 230 Park Ave., New York City. He joined the company about a year ago as assistant general manager of sales after having been with Bethlehem Steel Co. for 22 years.

WESTINGHOUSE AIR BRAKE CO., Wilmerding, Pa., has appointed W. V. Walkinshaw as manager of industrial sales, vice the late Roland C. Justus.

WORTHINGTON PUMP & MACHINERY CORP. has become one of the nation's largest manufacturers of construction equipment with the acquisition of the Ransome Machinery Co. line of concrete machinery. C. F. Oechsle, assistant vice president of Worthington, has been placed in charge of the Worthington-Ransome Construction Equipment sales organization, with headquarters at Holyoke, Mass. He will be assisted by W. F. Lockhardt, sales manager of Ransome Machinery Co., Dunellen, N. J., and W. J. Fleming, field sales manager, Holyoke.

VALVE MANUFACTURERS ASSOCIATION has elected as president W. B. Holton Jr., president of the Walworth Co. He succeeds Ernest Cochran, vice president of the Chapman Valve Mfg. Co. Other officers named by the association are: vice president, Lucien W. Moore, manager, valve and fitting dept., Crane Co.; J. P. Ferguson, sales manager, Reading-Pratt & Cady Division, American Chain & Cable Co.; C. W. Burrage, secretary, Lunkenheimer Co.; secretary-treasurer, George A. Cooper.

WILLIAM J. MONTGOMERY, 71, who for 28 years had been in active charge of the development and sale of mine fans for the Jeffrey Mfg. Co., died Feb. 4 at his home in Columbus, Ohio. Though relatively inactive since 1935, he had maintained contact with the company as consulting engineer on problems of mine ventilation. An authority on this subject, he published in 1936 "Theory and Practice of Mine Ventilation," a widely used textbook.

CYRUS S. OLDROYD, 73, president, Oldroyd Machine Co., died Feb. 3 in the lobby of the Hotel Lincoln, New York City, of a heart attack. With his brother, Fred, he invented the Oldroyd loader. The brothers also invented a universal cutting machine.

3-in-1
BLOW — CLEAN — SPRAY
with TORNADO

With its 1 h.p. G.E. motor, TORNADO Portable Electric Blower blows dust, dirt and lint out of motors, generators, shafting, etc. With bag and attachments added, it is convertible into a Vacuum Cleaner, for cleaning shelves, bins, floors and light salvaging. With other attachments, it can be made into a Sprayer, for spraying insecticides. Keeps equipment and plant clean for faster production and lower costs. Saves power—reduces hazards—lowers upkeep.

Request details and FREE TRIAL Offer

BREUER ELECTRIC MFG. CO.
5098 Ravenswood Ave., Chicago 40

TAKE THE DUST OUT OF INDUSTRY
BREUER'S BALL BEARING
TORNADO
PORTABLE ELECTRIC BLOWER

ST. LOUIS
a great city

HOTEL MAYFAIR
a great hotel

DOWNTOWN ST. LOUIS AT YOUR DOORSTEP

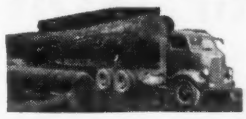
TRACTION off the Highway!

This is the Thornton Drive Bogie, consisting of 2 driving axles; 2-speed gear case assembly with *Automatic-Locking* Differential in ring gear, "walking beam" type springs; wheels; 8 new tires.

THORNTON gives positive DRIVE TO BOTH REAR AXLES *Without Axle Fight*

Trucks operating off the highway must have 2 rear driving axles with *positive drive* to provide maximum traction.

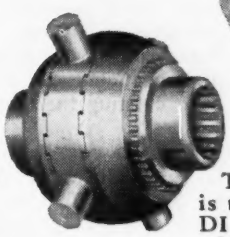
The THORNTON *4-Rear-Wheel* DRIVE has proved, through years of grueling work and severe war demands, that it does deliver "go ahead" traction under the most obstinate conditions (and provides 100% more payload; up to 50% gradability; and, certain definite operation economies).



Whether you haul logs from the woods; sand and gravel from the pits; coal from the mines; spread lime over soft fields; or haul heavy oil field equipment; you need the maximum traction provided by the Thornton Drive. Thornton equipped trucks have the power and traction to operate in all kinds of weather, over all kinds of roads. They will work many more days per year than a conventional truck having only one driving axle.

However, *positive drive* to the rear driving axles is not all that is required to give you the greatest number of truck-work days per year. The Drive also must have *Differential Action* to avoid "axle fight" which causes tires to scuff, wastes fuel, and destroys ring gears, pinions, joints, etc.

*** NO WPB RELEASE NECESSARY**

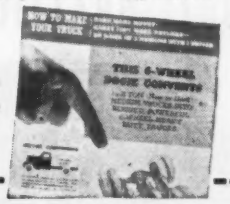


The heart of the THORNTON DRIVE is the THRONTON *automatic-locking* DIFFERENTIAL—an exclusive feature which provides both POSITIVE DRIVE and DIFFERENTIAL ACTION.

Thornton's solution to the problem of obtaining "off the highway traction" without having "axle fight" represents one of the outstanding contributions to the automotive industry during the past 30 years. This *automatic-locking* DIFFERENTIAL, as an integral part of the Thornton Drive, enables the truck to drive as long as there is traction on the wheels of either axle. Its automatic Differential action permits an over or under running of the ring gear of either axle as required by the contour of the road bed, whether moving forward or in reverse.

When the THORNTON DIFFERENTIAL is also used in place of the conventional differential in each driving axle, the ultimate in traction is provided, because *all wheels must rotate* when power is applied.

FREE: *Mail coupon for descriptive folders and full details about the Thornton Four-Rear-Wheel Drive.*



EVERY

THORNTON 4-Rear-Wheel DRIVE

INCORPORATES A

THORNTON Locking DIFFERENTIAL

ALSO AVAILABLE FOR TRUCK AXLES

Thornton Tandem Co.

8701 Grinnell Avenue, Dept. 20, Detroit 13, Michigan, U.S.A.

Please send me catalog of facts on changing my 1½-2 ton truck into a heavy duty truck.

Name _____

Address _____

City _____ State _____

Make of Truck _____ Year _____

Used for _____

Rubber life rafts are most important life-saving equipment—but they've got to have air to serve their purpose most efficiently. To accomplish this, air tanks for quick inflation are supplied.

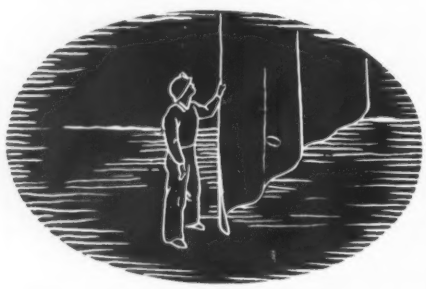
To get air to the boys at the working face, many mines use ABC JUTE BRATTICE CLOTH.

Adequate ventilation is vitally necessary to safe, efficient mine operation. Use American Brattice Cloth—closely woven construction cuts air-leaks to a minimum — special chemical treatment renders it abrasion, flame, and rot-proof. ABC can be moved easily — used over and over. Its surface is smooth, thus passing machinery or cars cannot pull it down or damage it. These features combine to assure proper ventilation at minimum cost — advantages that can be yours! Write today for complete information.

•

Invest in Victory
BUY WAR BONDS

ABC
JUTE BRATTICE CLOTH



AMERICAN
BRATTICE CLOTH CORP.
WARSAW - INDIANA

Trade Literature

COAL CRUSHERS AND BREAKERS—McNally-Pittsburg Mfg. Corp., Pittsburg, Kan. Bulletin 342 presents full line of breakers for handling the largest lumps produced and reducing to egg or nut sizes, and crushers to reduce to screenings or stoker sizes.

ELECTRICAL CONNECTING DEVICES—Howard B. Jones Co., 2460 W. George St., Chicago 18. Catalog 14 illustrates and describes complete line of multi-contact plugs and sockets, terminal strips, fuse mounts, etc. Complete listing of entire line of barrier strips is included, with dimensional data on all items to simplify ordering.

PROTECTED-TYPE MOTOR — Crocker-Wheeler Division, of Joshua Hendy Iron Works, Ampere, N. J. Bulletin describes and illustrates a new protected-type motor designed for both drip-proof and open-motor applications. A cutaway view shows how this construction provides protection against many of the most common hazards encountered in operation. It is pointed out that the motors are rated on the same basis as conventional open types—40 C rise, full-load continuous duty, with a 15 percent service factor. Also shown are the centrifugal bearing seals, Alucast rotor, vinyl acetal protected windings and the internally shielded, partially inclosed frames and shields to prevent metal chips, dripping liquid and other foreign matter from entering the motor.

CHARGER FOR FLASHLIGHT BATTERIES—B. F. Goodrich Co., Akron, Ohio. Catalog Section 12030, on its recently introduced charger for rechargeable flashlight batteries, describes the equipment, tells its functions and pictures methods by which it may be attached to the vehicle.

BAROMETRIC CONDENSERS—Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y. Bulletin Form 9012 covers both the disk-flow and ejector-jet types, explaining the uses, advantages and operation of each. Several schematic diagrams illustrate how these vacuum-producing systems work and a number of halftones show the condensers in various industries.

SYNTHETIC RUBBER GLOVES — B. F. Goodrich Co., Akron, Ohio. Catalog Section 9035, on all-synthetic industrial rubber gloves, features a page of illustrated instructions on how to get the most service at the lowest cost from acid and industrial rubber gloves.

BUFFER TABLETS—Burrell Technical Supply Co., 1936-42 Fifth Ave., Pittsburgh, Pa. Bulletin B-205 cites the advantages of Coleman certified buffer tablets for pH precision, convenience and economy.

HARD-FACING—Mir-O-Col Alloy Co., 2416-30 East 53d St., Los Angeles 11, Calif. Booklet, Weldors' Guide, is an effort to set forth simply and understandably the result of 20 years of research and application of hard facing.

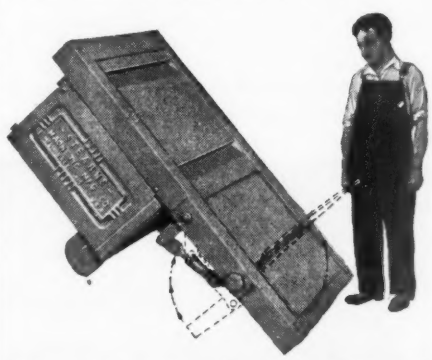
PUMPS—Marlow Pumps, Ridgewood,

Stearns
Spout
MAGNETS
Catch the
TRAMP IRON

Tramp Iron is Bad—may ruin your machinery, hold up production, may menace safety, may cause disastrous explosions and fires, will bring damaged stoker headaches for your customers.

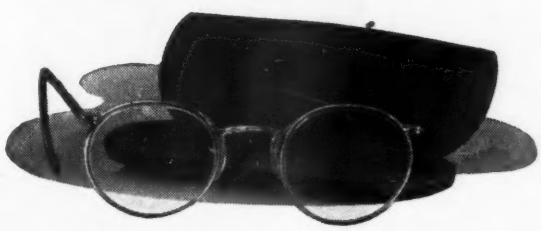
Stearns Automatic Spout Magnets, electrically energized for more power, will do a surprisingly fine job in catching tramp iron in your processing flow. And —the value of the accumulated scrap metal will help, if not entirely pay for the magnetic equipment.

In sizes to fit your conveying system. Write for data, describe your layout, send drawing if possible.



STEARNS MAGNETIC MANUFACTURING CO.
661 S. 28th St., Milwaukee, Wis.
SEPARATORS PULLEYS CLUTCHES BRAKES

A SPECK OF STEEL LODGED IN AN EYE . . . CAN COST MORE THAN A DIAMOND



Valueless in itself, this speck of steel became costly in the split second it took to cause an eye accident. The final bill was $343.00.*

An adequate eye-protection program demands a place in every *cost reduction* program. And, because American Optical Safety Goggles are light, cool, comfortable and easy-to-wear, their protection is now readily accepted by workers in every field of industry.

Ask your Safety Director to consult with an A. O. Safety Representative. There is an American Optical Branch Office in every large industrial center.

*Average cost of compensation and medical treatment for eye accidents, according to insurance company figures.

American Optical
COMPANY
SOUTHBRIDGE, MASSACHUSETTS

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Consulting Engineering Examinations Specialists
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ALLEN & GARCIA CO.
ENGINEERS AND BUILDERS OF MODERN COAL OPERATION
Authoritative Valuations and Reports of Mining Properties Equipment and Operation.
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Consulting Engineers
Valuation, Mine Mechanization and Coal Preparation.
1100 Union Trust Bldg.
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EAVENSON & AUCHMUTY
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Coal Operation Consultants
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J. H. FLETCHER
30 Years
Continuous Consulting Service to Coal Mines
Telephone Harrison 5151
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COAL PREPARATION
To Yield Maximum Net Returns
Face and Product Studies
Plant Design and Operation
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C. C. MORFIT & ASSOCIATES
Consulting Engineers
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11 Broadway, New York 4, N. Y.

SHERWIN and JANVRIN
Mining Engineers
Pineville, Ky.
Reports on COAL PROPERTIES
Planning, Construction & Supervision

L. E. YOUNG
Consulting Engineer
MINE MECHANIZATION
MINE MANAGEMENT
Oliver Building—Pittsburgh, Pa.

N. J. Handbook entitled "Self-Priming Centrifugal Pumps" sets forth the principles of centrifugal action, the physics of pumping and the evolution of self-priming centrifugal pumps. Besides giving basic engineering information the booklet tells the difference between the types of self-priming centrifugals, points out where self-primers can be used with best effect and details how to install and care for them.

HOSE COUPLINGS—Hose Accessories Co., 2702S North 17th St., Philadelphia 32, Pa. Booklet tells how to select and attach hose couplings for best results.

DEEPWELL PUMPS—Byron Jackson Co., Los Angeles 54, Calif. Bulletin 44-5000 illustrates and describes three new deepwell pump types having more than 100 impeller designs, each with different hydraulic characteristics.

HALFTRACKS—Linn Mfg. Corp., Morris, N. Y. Folder describes Linn Halftraks with rear or side dump bodies—capacity, 5 to 50 tons—and Catruks for off-the-highway operation, said to feature built-in qualities of power, strength, traction and flexibility.

FEEDERS AND CONVEYORS—Chain Belt Co., Milwaukee, Wis. Bulletin 462 describes Rex apron and pan feeders and conveyors for handling coal, coke and many other materials. Featured are design details, cross-sections, capacity tables and specifications tabulated for quick comparison.

PLASTIC COATING—Amercoat Division of American Pipe & Construction Co., Los Angeles, Calif. Folder gives full details of uses and technical facts about No. 44 plastic coating, whose outstanding property is said to be resistance to corrosive chemicals, particularly acids.

WELDING AND CUTTING APPARATUS—Victor Equipment Co., 844-54 Folsom St., San Francisco, Calif. Catalog Form 23 presents a pictorial preview of Victor gas welding and cutting apparatus featuring great interchangeability of parts, nozzles and tips—giving wide operating range to each torch type.

PNEUMATIC TOOLS — Ingersoll-Rand Co., 11 Broadway, New York City. Folder Form 117, entitled "Air-Operated Tools for Maintenance, Construction, Demolition," shows I-R air tools and portable compressors. Only representative models are pictured, although ample information is given as to size ranges and model variations. Illustrated are air tools on construction, demolition and plant maintenance jobs. Various accessories to air-tool operation also are shown, such as hose couplings, air-line lubricators, steels and jackbits.

CAR PULLER — American Engineering Co., Philadelphia. Folder describes the new Class 2½ Lo-Hed car puller—called the "One-Man Gang"—a husky hauling device in which the barrel, gear box and motor are said to be integrated in a single streamlined unit. Starting line pull is 5,000 lb., using a single line, or more with various combinations.

for dependable **HEAD PROTECTION**

COOL CAP

With Flexo-Band for ready fit, air-conditioned for comfort. Available with or without bracket or with special attachment for carbide lamps.

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MINER'S BELTS and BATTERY CARRIERS

Made from 8 oz. grain bridle leather with rugged buckles, with or without battery straps—1¾" to 3". Also available in Sam Brown style.

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RUBBER KNEE PADS

A serviceable, comfort-giving rubber knee cushion built to mold itself to the contour of the knee. Adjustable straps embedded completely in the rubber by a patented process. Fits any knee and will not slip.

All Portable products are made from tested materials to give uniform performance. Write or phone GRant 1061 for information about Safety Equipment for Mines and Industry.

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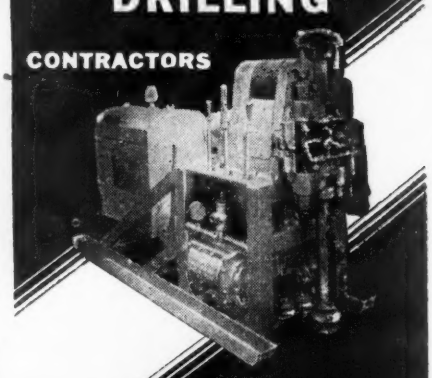

Mott Type "A" Oil Hydraulic 1500 Ft. Cap., 2¼" Diamster Core.

● Coal and all mineral properties tested—using our light gasoline drills. They save fuel and moving costs . . . guarantee satisfactory and proper cores.

Pre-pressure grouting for mine shafts. ground solidification for wet mine areas by our stop grout method. Water wells and discharge holes drilled and grouted . . . electric drills for inside mine drilling.

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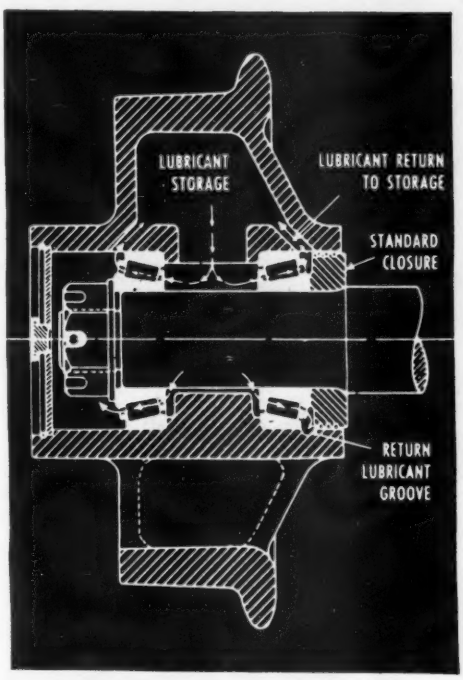
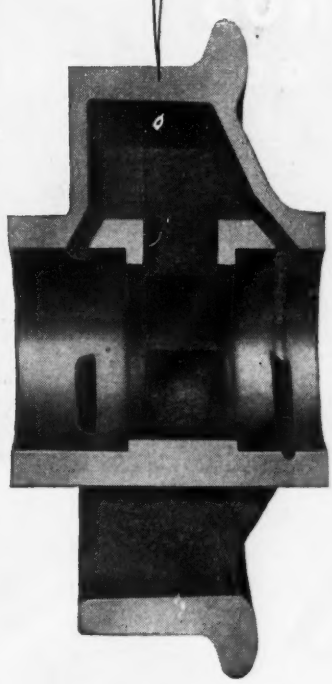
Like a ROBOT RE-OILER

that requires no attention for several years





The wheel with the built-in lubricating system

ONE OILING . . . and no more attention for *several years!* The "Oilspok" Wheel takes care of its own lubricating, automatically. Every time the "Oilspok" Wheel starts turning the lubricant starts flowing—positive and continuous, giving the bearings longer life, keeping them cool and clean and always like new, and assuring free-turning wheels under all weather conditions. 5000 to 6000 miles on one lubrication.

The oil in the reservoir spokes of "Oilspok Wheels" is sealed in, yet gives constant lubrication to bearings.

No loss due to pumping action of bearings or to air expansion. No loss of bearing parts.

"Oilspok" Wheels can be furnished for all mine car bearing sizes in diameters from 10 inches to 20 inches. They are made with both standard and labyrinth enclosures, and for plain or roller bearings. Any type oiler or oil plug can be furnished or used.

Save maintenance costs . . . make sure of uninterrupted, long-life car wheel service. Use "Oilspok" Car Wheels. Write for full information.—HOCKENSMITH WHEEL & MINE CAR COMPANY, *Established 1877, Penn, Pa., Phone—Jeannette 700.*

"OILSPOK" WHEELS WILL—

1. Increase Wheel Life. Excessive tread wear—caused by the churning resistance of heavy greases—is eliminated. Free wheel rotation.

2. Save Power. Free wheel rotation means no power lost by churning grease. The lubricant in the "Oilspok" wheel is fluid and free flowing.

3. Save Lubricant and Lubricating Labor. "Oilspok" lubrication is positive and continuous—no loss due to bearing pumping pressure or air expansion. One greasing lasts several years—less labor cost and loss of car service.

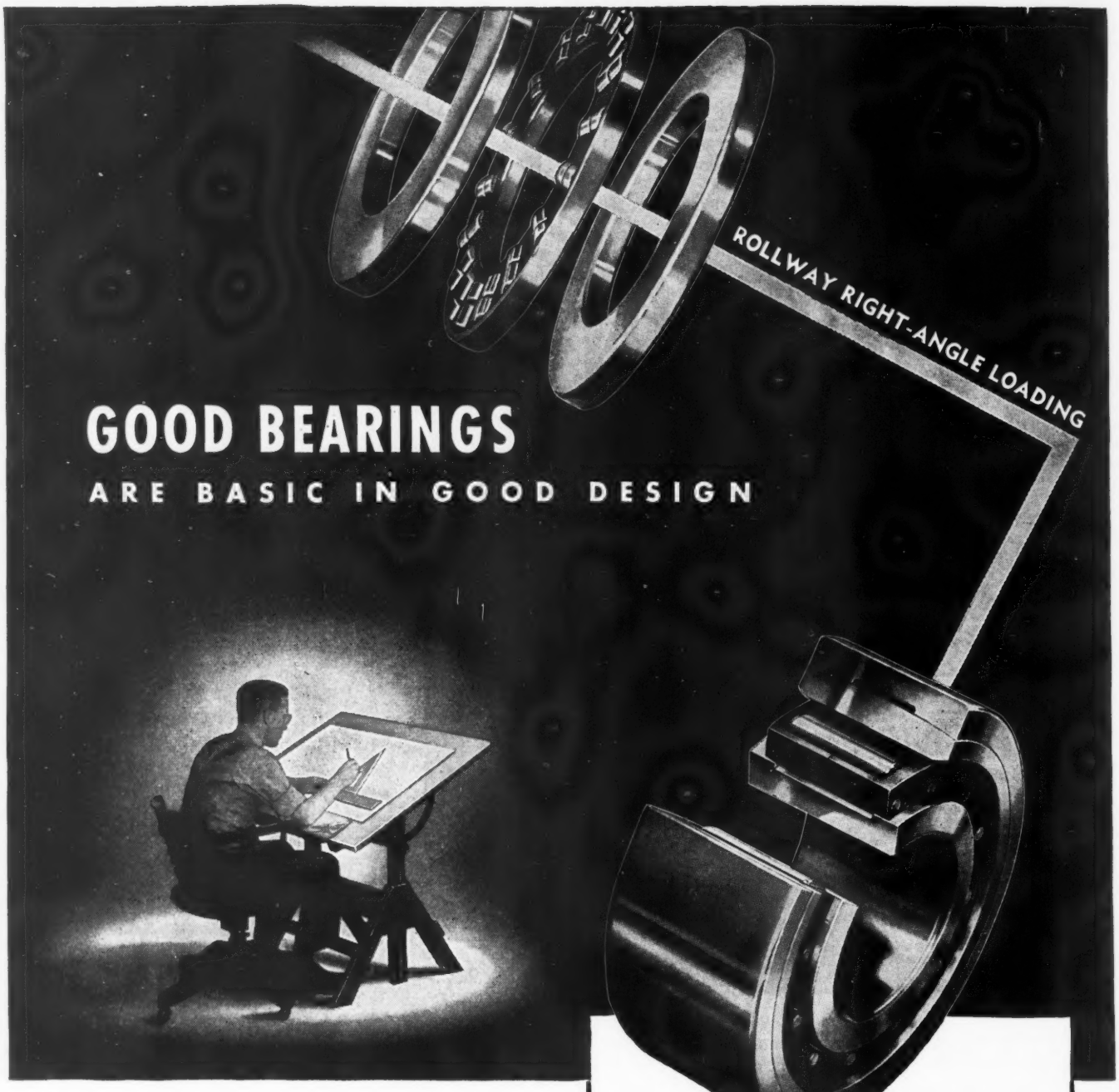
4. Give Longer Bearing Life. Bearing lubricant is constantly changed—bearings clean and cool—constant circulation maintains lubricant in better condition.

5. Increase Axle Box Life. "Oilspok" wheels are free turning under all temperature conditions—no chance of axles turning in dry boxes.

6. Eliminate Disadvantage of Small Diameter Wheels. Higher hub resistance—a characteristic of small diameter wheels with large bearings—is substantially reduced in "Oilspok" wheels with their positive, circulating fluid lubrication.

7. Provide Stronger Wheel—No Extra Weight. "Oilspok" wheels have tapered box-section spokes—the strongest possible construction for resisting side thrust and vertical loads. Same weight as standard wheels for various bearing and axle sizes.

Hockensmith *"Oilspok"* Wheels



GOOD BEARINGS

ARE BASIC IN GOOD DESIGN

You won't get far in postwar competition without good bearings. And for any machine, a good bearing means simply that type which handles the load most efficiently and economically with the least maintenance cost and worry. That's where Rollway's Right-Angle Loading shines. It reduces load magnitudes and simplifies stresses. There's no piling of thrust loads on radial bearings or radial loads on thrust bearings. Shut-downs for bearing service and replacement are few and far between.

No Oblique Resultants . . .

Rollway's Right-Angle Loading splits compound loads into their two components of pure radial and pure thrust. Each component is carried at right angles to the roller axis on separate bearing assemblies. No oblique loads and resultants, no thermal float or uncalculated thrust can impose secondary pressures on any Rollway Bearing. That means a bearing of given dimension will last longer, or carry heavier loads, or run at higher shaft speeds, or give any proportional combination of all three. Send us your drawings for free analysis. Without cost or obligation, we'll tell you how to get more service from your bearing dollars.

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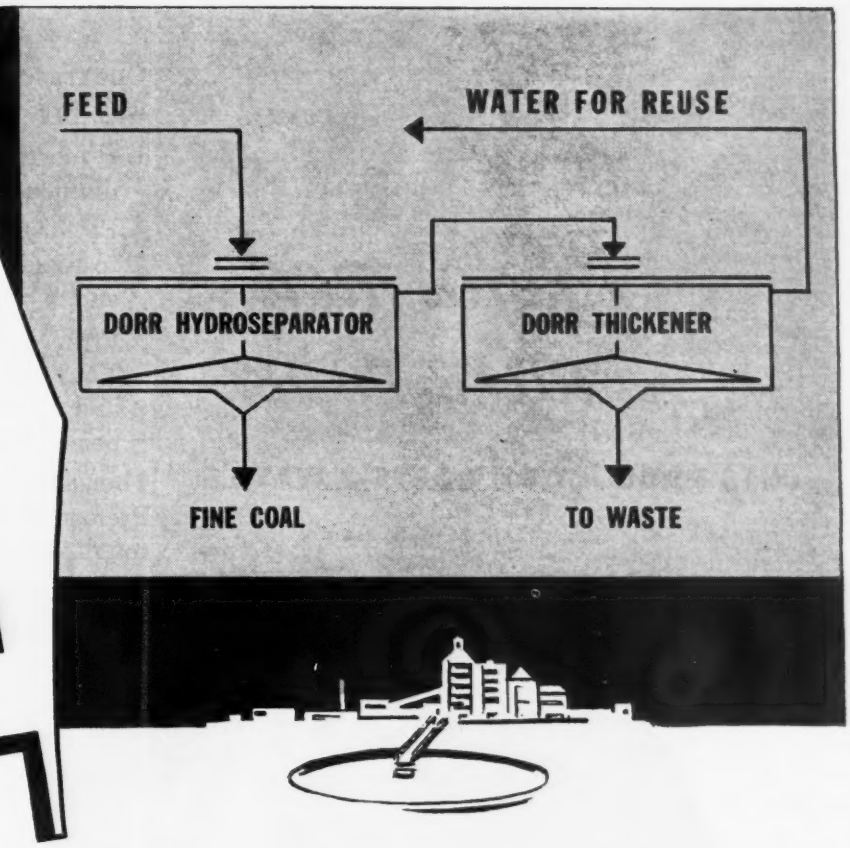
Here's a SOLUTION to stream POLLUTION



This simple flowsheet will eliminate stream pollution while recovering fine coal of marketable size.

This combination of Dorr Hydroseparator and Dorr Thickener performs two important jobs:

Used wash-water is clarified for re-use—a possible economy depending on certain local conditions.

Fine sizes of coal are recovered, which may be blended directly or treated further if required.

Stream pollution, loss of fine sizes, excessive costs—all three are eliminated with this one Dorr installation.

Blueprint Now! FOR TOMORROW'S NEEDS

Upon request, a DORR engineer will visit your plant, study conditions and then make recommendations for equipment designed to meet your particular requirements.

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PETREE & DORR DIVISION
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Preformed wire rope

CUTS PRODUCTION COSTS 3 WAYS

One reason is enough—but here are *three* reasons why Preformed wire rope cuts production costs:

1. Preformed lasts longer; pays bigger dividends on wire rope dollars.
2. Preformed rotates less. You don't have to repair or replace sheaves, drums and rope so often.
3. Preformed winds easily on drums. You encounter fewer delays. Your men and machines produce more per day, per month, per year.

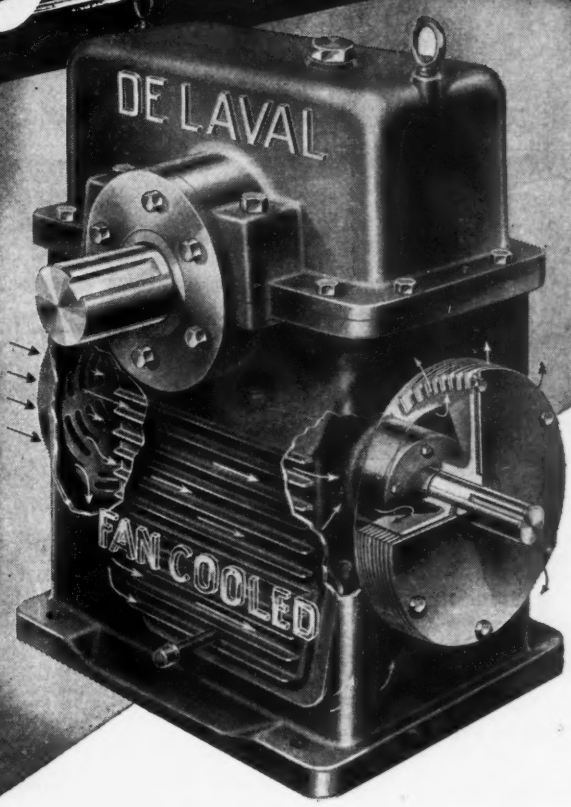
Thousands of operators have standardized on Preformed—and use nothing else on tough wire rope jobs.

ASK YOUR OWN SUPPLIER FOR PREFORMED WIRE ROPE

SOON AVAILABLE

NEW FAN-COOLED

DE LAVAL WORM GEAR



HIGHER CAPACITY

Capacity is approximately doubled for all ratios at 1750 r.p.m. as compared with standard heavy duty units of the same frame size.

LOWER COST PER HORSEPOWER

Operation at higher ratings permits the use of correspondingly smaller and less costly units.

SMALLER SIZE

Reduction of as much as two frame sizes in some instances. The use of smaller, lighter units results in a saving both of floor space and of critical materials needed for the war effort.

The *NEW* DE LAVAL *FAN-COOLED* WORM GEAR SPEED REDUCER

will soon be available in a complete line of sizes. Send for literature now being prepared.

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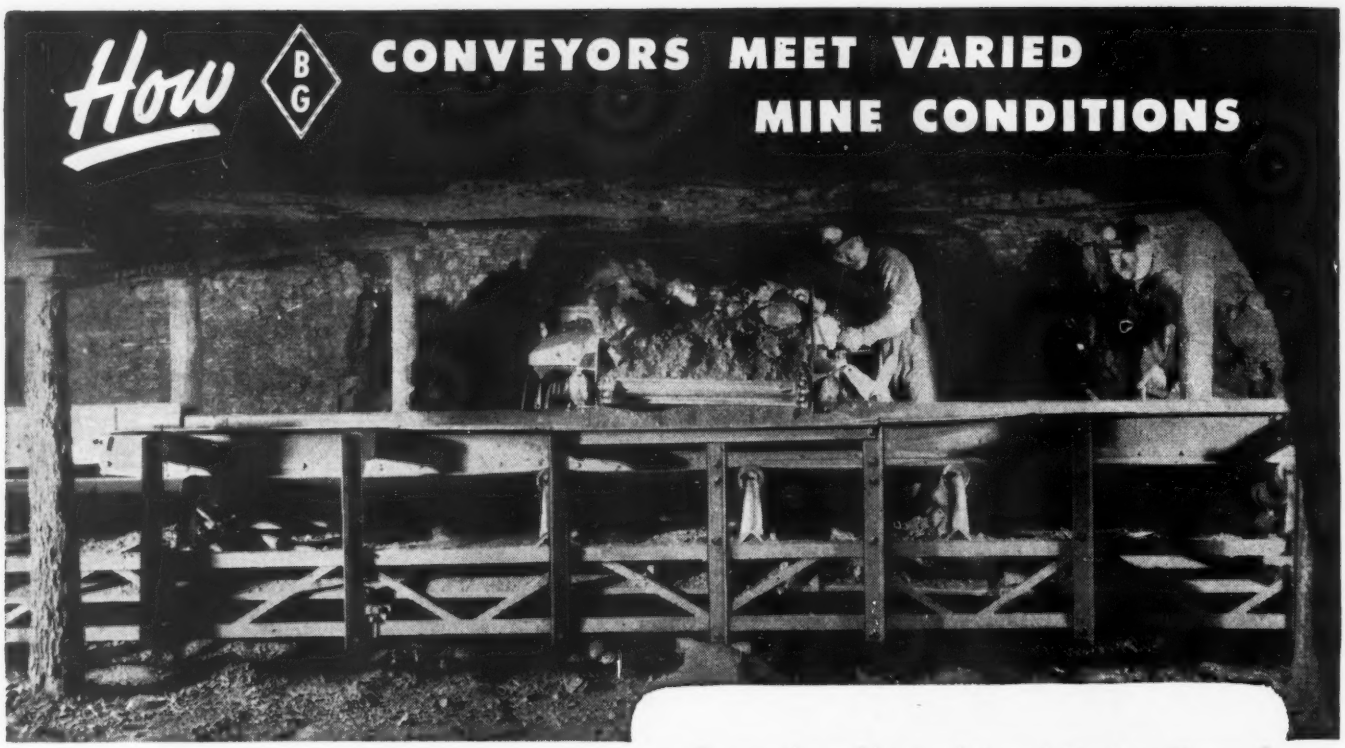
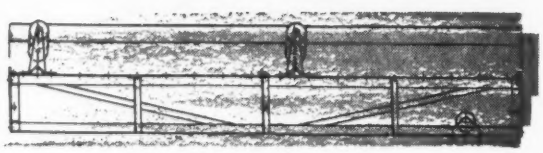
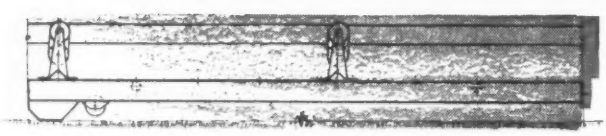
How B G CONVEYORS MEET VARIED MINE CONDITIONS





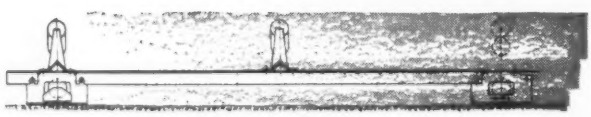
Truss Conveyor Frame

Built for Strength and Endurance



Channel Conveyor Frame

Ideal for Low Headroom



Low Seam Conveyor Frame

Designed for Frequent Moving

• From the wide variety of Barber-Greene *standardized* frames, terminals, power drives and take-ups, you can select those units best suited to the particular requirements of an underground conveying system in your mine.

Truss frames, for instance, are designed for main-entry duty. The truss design provides extra rigidity to maintain true alignment over uneven bottom curves and for long unsupported spans.

Channel frames have sturdy skid legs for low mounting directly on the mine floor. Just bolt the sections together — each one is a self-contained unit.

And when frequent extension or moving is required, the demountable frame of the low seam conveyor will save many hours of precious time.

Barber-Greene conveying equipment can be easily adapted to your mine. Mine Catalog 66 illustrates with many drawings and installation photos how B-G mine conveyors are now meeting a variety of mine conditions. For your copy, write to Mining Department, Barber-Greene Company, Aurora, Illinois.

44-68

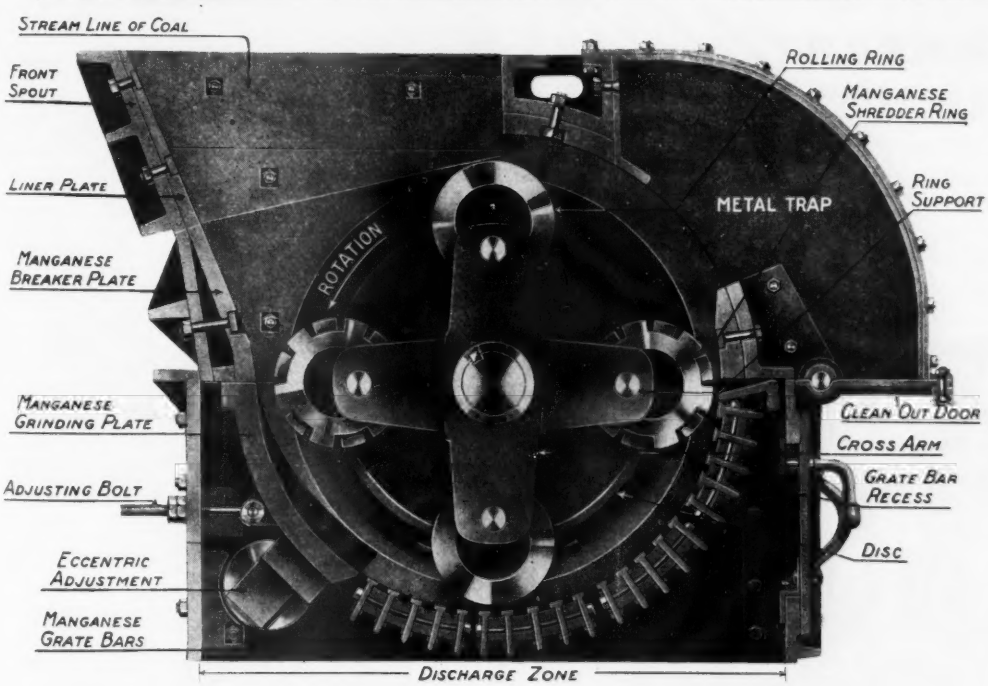
Barber-Greene B G *Constant Flow Equipment*

Design that assures greater tonnage at much less crushing cost . . . .

★ The splitting action of the Patented MANGANESE SHREDDER RINGS shatters and distributes the coal before it reaches the Breaker and Grinding Plates. These patented reversible manganese steel SHREDDER RINGS are found only in the American Rolling Ring Crusher. They have twenty cutting edges or teeth and are designed to maintain their outward position by centrifugal force at the specified speeds. In contact with solid metal, the rings are momentarily deflected from their usual course because they are free to swing back out of position. There are no shear pins or other safety devices that require attention.

GRINDING PARTS

★ The crushing parts are: breaker plate, grate bars, and rings. All made of manganese steel. It applies centrifugal force at right angles to a horizontal shaft. The rings strike, roll and grind. They are thrown back when they encounter non-crushable material, protecting the crusher from damage by foreign materials. This flexibility or "give" makes the crusher self-acting against tramp material.



OPERATES AT LESS THAN ONE CENT PER TON—

Through many years and including all types of AMERICAN ROLLING RING CRUSHERS in a variety of mines, the operating costs to users was less than one cent per ton to reduce bituminous coal from lump to stoker size. This low figure, including all costs—power, labor, maintenance and interest on investment.

AMERICAN ROLLING RING CRUSHERS

Some of the BENEFITS

You get greater range of reduction, you get uniformity of sizes, you have accessibility at all times, you have a crushing unit of extreme flexibility, you have high tonnage results with high safety factor, you have a unit that is simple in construction, yet durable and that is easy to operate.

AMERICAN PULVERIZER COMPANY

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ORIGINATORS AND MANUFACTURERS OF RING CRUSHERS AND PULVERIZERS

STRIP OVER-BURDEN FASTER

KOEHRING SHOVELS GET DOWN TO COAL QUICKER

Koehring power, speed and positive control pay off in removing over-burden from coal seams. Extra power helps Koehring shovels dig out the toughest rock-and-dirt strata. Extra speed fills up more hauling units per day. Positive control means bull's-eye spotting of every dipper load and close-in cleanup digging that leaves seam surfaces clean.

KOEHRING COMPANY
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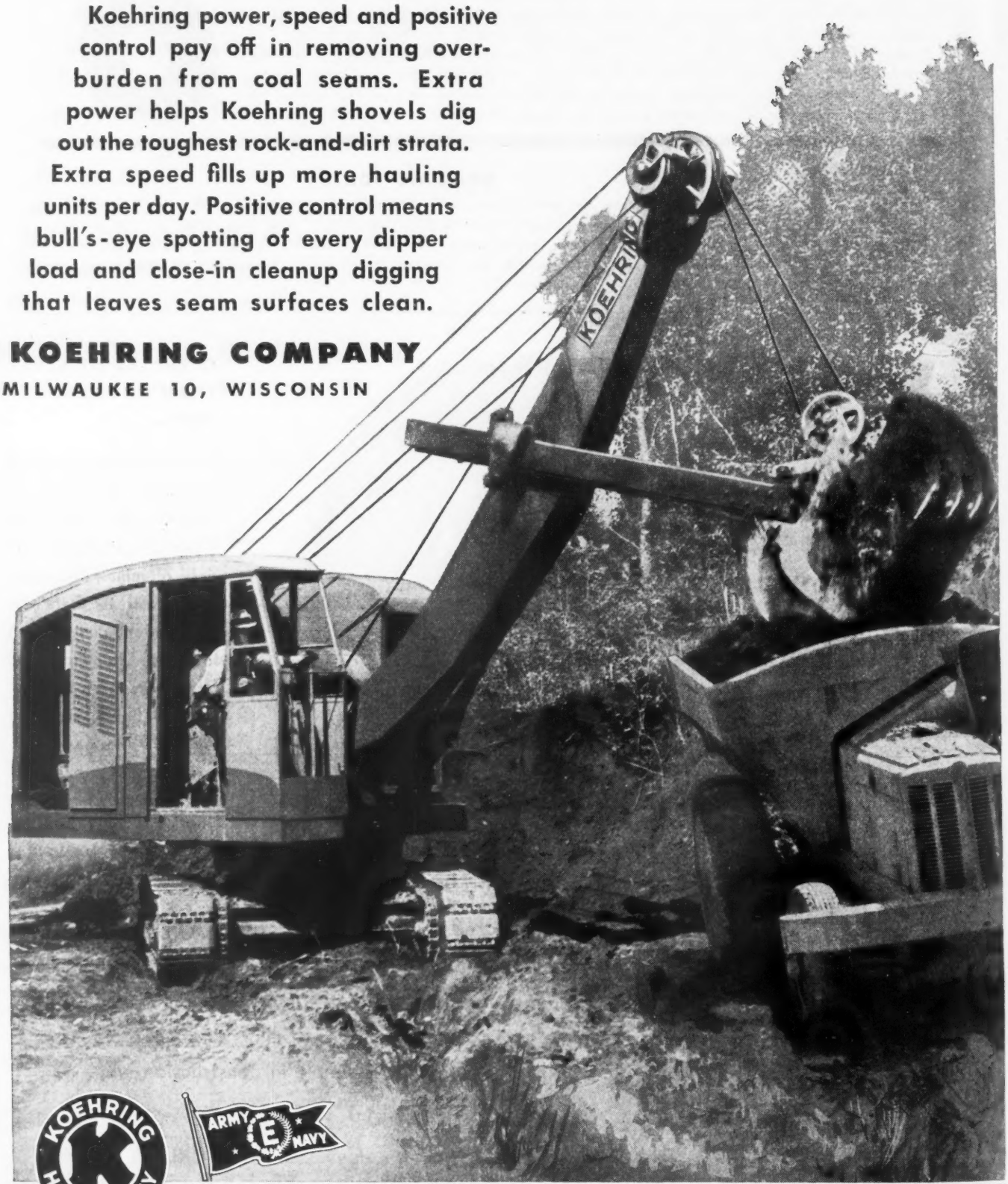
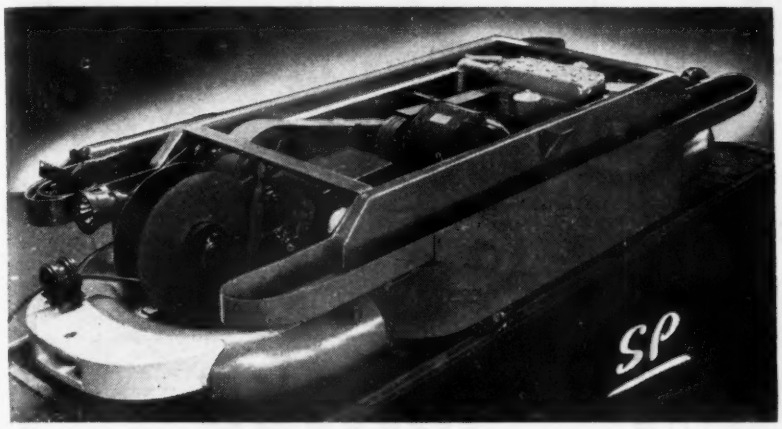
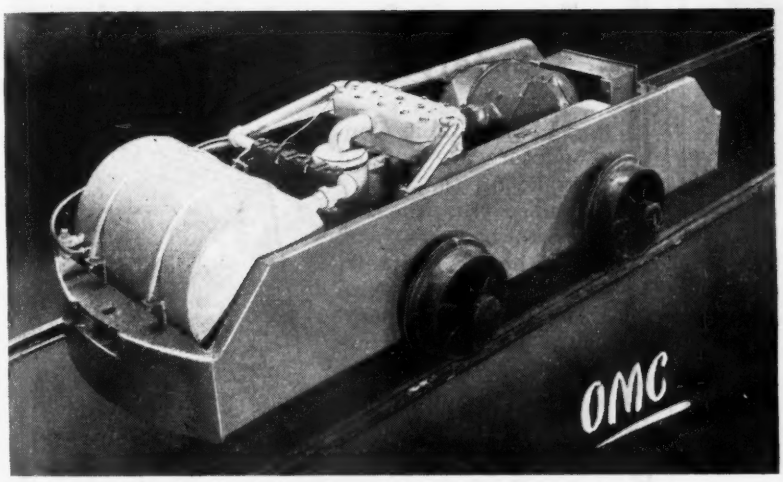


HEAVY-DUTY CONSTRUCTION EQUIPMENT

WE BEGAN AT THE COAL MINES TO BUILD THESE FOUR CANTRELL COMPRESSORS





• There is a Cantrell Compressor built to meet every coal mine requirement. And each one is built to do its job the way coal mining men want it done. The assistance of practical coal mining men in the development of Cantrell Compressors accounts, in a large measure, for their success.

All Cantrell Compressors are, first, simple in design and easy to operate. No fancy frills or "gadget" trouble makers are used on a Cantrell. Second, Cantrell Compressors are built rugged to stand up under hard service. Third, they are sold at a price that most mines find it pays to have two or more on hand to take full advantage of their savings in time and money.

THE CANTRELL, TYPE SP, is a completely independent machine. It's on its own at all times—waits on nothing. In addition to its self-tramming feature, with a single motor for both tramming and compressor use, it serves as a locomotive for hauling crew and equipment, transfer of cars, and many other duties.

THE CANTRELL, TYPE O.M.C., is a machine for use in mines where it is preferred to pull the compressor in regular trips of cars or with an extra locomotive.

THE CANTRELL, TYPE C-1 is built for trackless mine use or for shop use where a movable compressor is preferred to stationary equipment.

THE CANTRELL, TYPE SL is our stationary type for shop use or for mounting in a mine car for transfer from place to place of service.

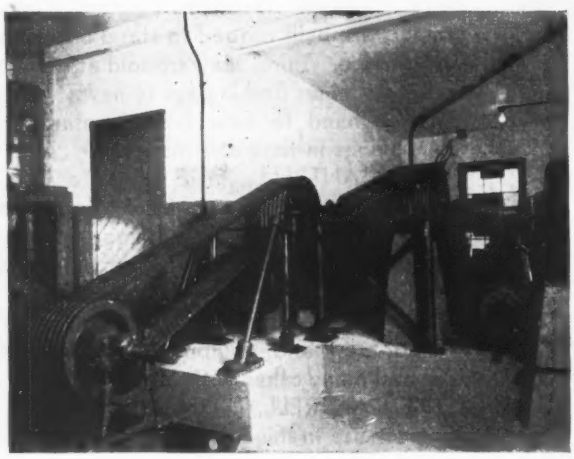
With any Cantrell Compressor, you get the advantage of our "compressor exchange plan". A plan whereby worn compressors are exchanged, at low cost, for factory rebuilt units.

Write now for complete information.

Cantrell COMPRESSORS

IMPERIAL BRONZE MFG. CO., JELLICO, TENN.

Continental
Mine Fan Drives
Meet Highest Safety Standards



This Continental installation in a modern coal mine shows Mine Fan V-Belt Drive operated by electric motor with auxiliary V-Belt Drive from Diesel Motor which can be quickly shifted over in case of power failure.

Continental manufactures an extensive line of modern coal mine equipment, including:

Shaker pans, hoists, belt conveyor idlers and accessories, apron feeders, and a complete line of power transmission equipment.

Complete engineering service and manufacturing facilities for standard and special equipment.

Send us your inquiries.

FOR THE WAR EFFORT

Six Army-Navy "E" Awards
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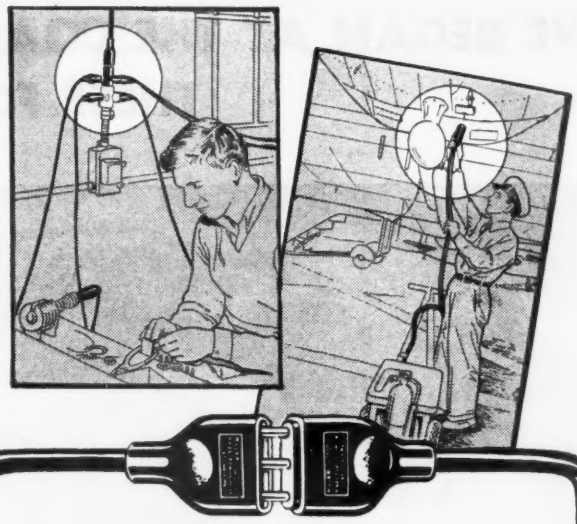


MINES

Water-Seal Cable Connectors Transmit Power to the Job Safely and Efficiently

Mines Cable Connectors are molded right on the rubber cable so that the connector becomes a part of the cable itself. The spring pressure female contact and the patented water-seal assure you a positive connection with the male connector for efficient power supply to any machine under all plant conditions.

For Any Portable Power Supply

Many types and sizes of Connectors have been developed, making them adaptable to almost any industrial application where power is transmitted by portable cable. Standard connectors are rated for loads to 600 volts.

Our engineers will gladly work with you in solving portable cable applications on capacities up to 5000 volts and 325 amps.

For efficient, safe, flexible power transmission by cable, use Mines Connectors—"The Connector with the Water-Seal."

WRITE FOR BULLETIN MC-106, *showing many successful applications of Mines Connectors throughout industry.*

MINES EQUIPMENT COMPANY

4260 Clayton Road
St. Louis 10, Missouri

The greatest help a coal mining man can have—

IF YOU want to make sure of getting your certificate of competency—sure of winning a bigger job with bigger pay, get Beard's great books today and put them to work for you.

In these three books you have a practical, always-on-the-job guide that will help you solve the problems you face every day, show you what to do, tell you why it should be done.

Beard's

Mine Examination Questions and Answers

3 volumes — $7.50, payable in four monthly payments

THESE books explain what a man must know in order to become a mine inspector, a mine foreman, assistant foreman, fireboss, hoisting engineer, safety engineer, shot-firer, etc.

They give you complete and authoritative information about air and gases, explosives, safety requirements and methods, mechanics, engines, hoisting, drainage, pumping, ventilation, timbering, instruments, and every other detail that the practical mining man must know.

Can you answer these questions—

What is meant by splitting the air current and what are the advantages derived from such methods?

Can a miner live in air in which the oxygen content is reduced to 17 per cent?

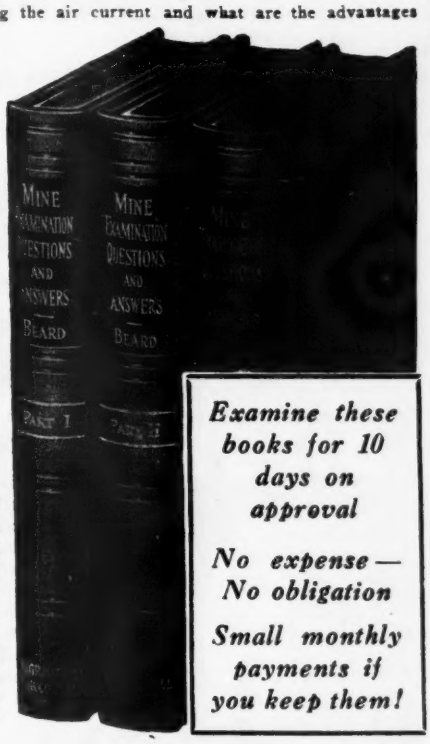
Name five duties imposed on mine foremen by law?

In what time can an engine of 40 effective hp. pump 4,000 cu. ft. of water from a shaft 360 feet deep?

What are the advantages and disadvantages of a gasoline pump, an oil pump and an electrical pump?

What is the estimated tonnage per acre, per foot of thickness, for bituminous coal?

These are but a few of the more than 2000 questions given in Beard's books together with full correct answers. Hundreds of men have used this method to prepare for higher, better jobs. You can too, if you have the Beard books and plan to use them systematically. They are the best investment that a mining man can make—not only as an aid for passing examinations but as practical reference volumes on everyday mining operation problems.



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Send me, charges prepaid, **Beard's Mine Examination Questions and Answers**, 3 volumes, for 10 days examination. If satisfactory I will pay $7.50 at the rate of $1.50 in ten days and $2.00 per month. If not wanted I will return the three volumes postpaid.

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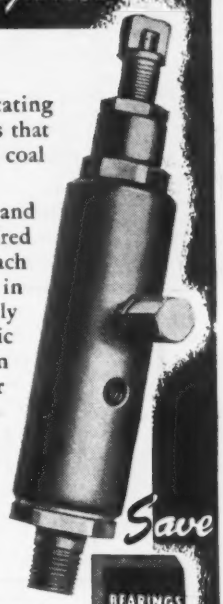
LINCOLN
CENTRO-MATIC LUBRICATING SYSTEMS

Save Bearings and Reduce Worker Injuries



Lincoln Centro-Matic Lubricating Systems are single-line systems that can be applied to all types of coal mining machinery.

They are simple in design and easy to install. All that is required is a Centro-Matic Injector for each bearing arranged singly or in manifold and connected by only a single line to a Centro-Matic Lubricant Pump. The pump can be either manually-operated or power-operated. Power-operated systems can have time clock or push-button control.

In addition to providing positive lubrication, these systems save time and minimize accidents. Machines can be lubricated while in operation and since lubricant is delivered direct to every bearing, it is not necessary to scale high tipples and work on dangerous conveyors as is the case when lubrication is done by hand.

Save
BEARINGS
MACHINE HOURS
MAN HOURS
POWER
and Prevent Accidents

Send for this Complete Bulletin

I WOULD LIKE TO HAVE FREE BULLETIN
On Lincoln Centro-Matic Lubricating Systems

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Company _____
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LINCOLN ENGINEERING COMPANY
Pioneer Builders of Engineered Lubricating Equipment
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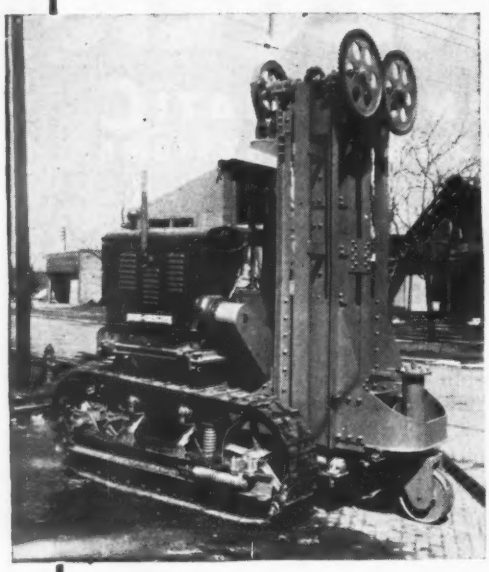
DOWN GOES THE COST OF SHOOTING COAL

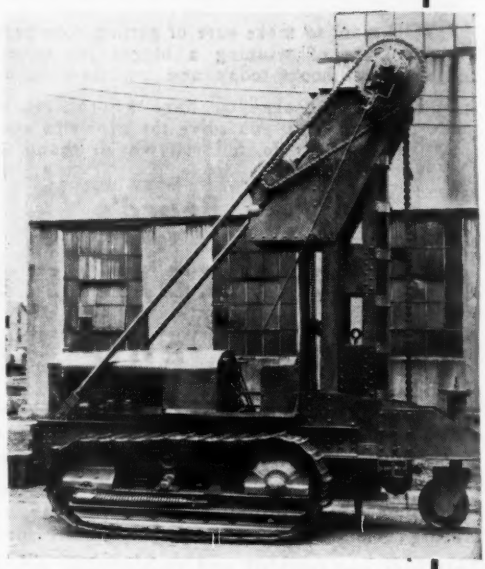


FRONT ←

BACK →

END

MOUNTED COAL PINNING MACHINE



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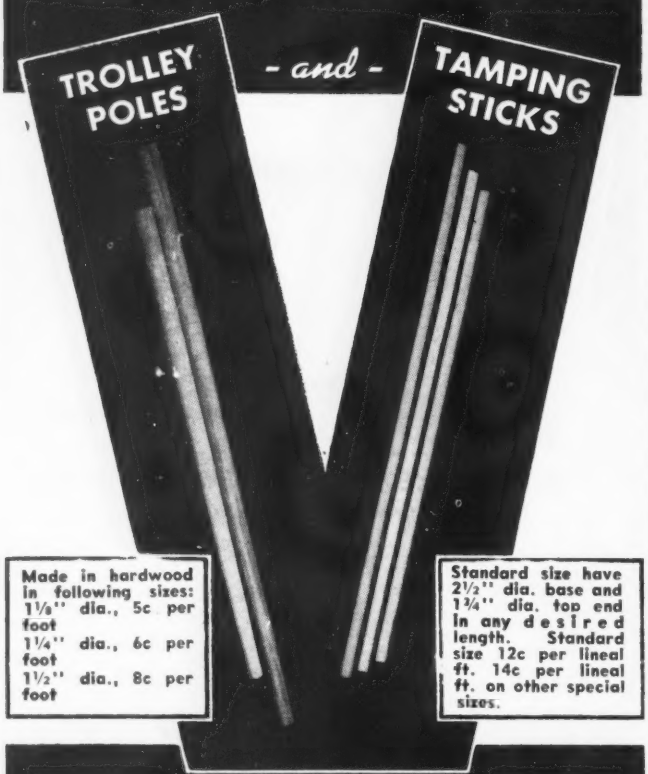

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Standard size have 2½" dia. base and 1¾" dia. top end in any desired length. Standard size 12c per lineal ft. 14c per lineal ft. on other special sizes.

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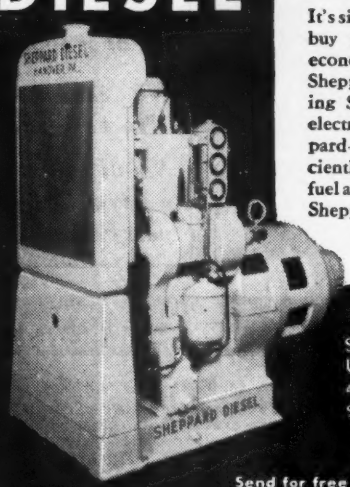

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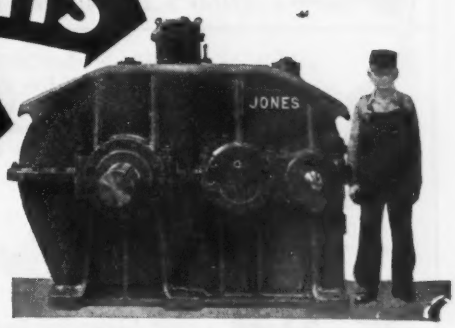

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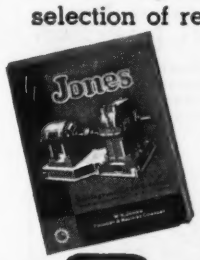

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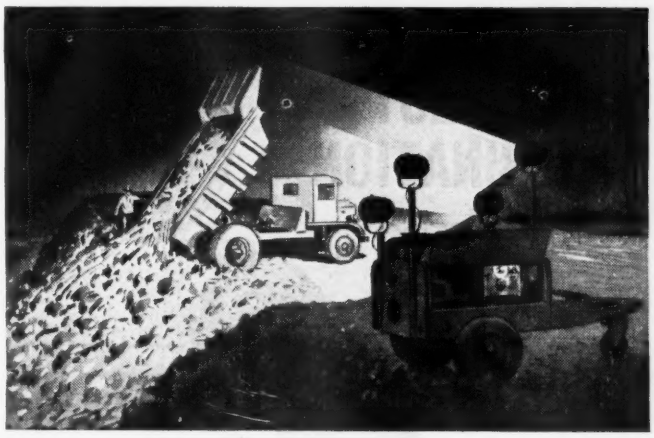

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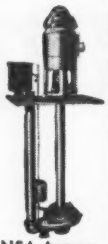
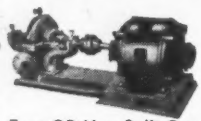


NSA Aurora Centrifugal Sump Pump

Type AD Hor. Split Case, Two Stage Centrifugal



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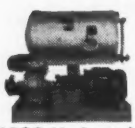

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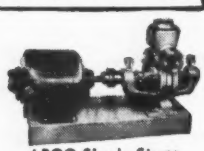

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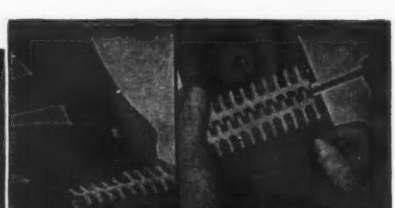

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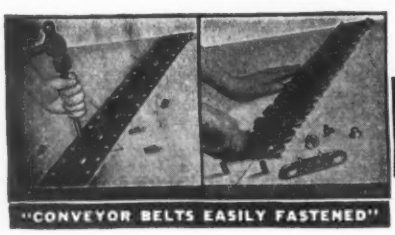

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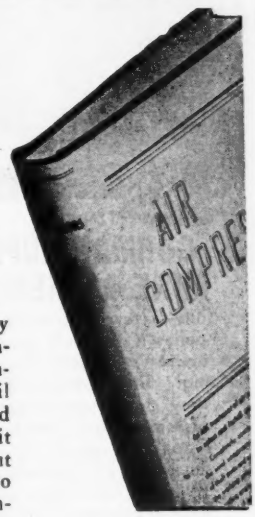

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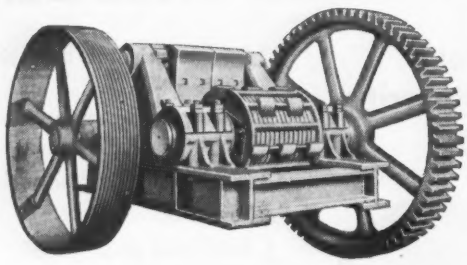

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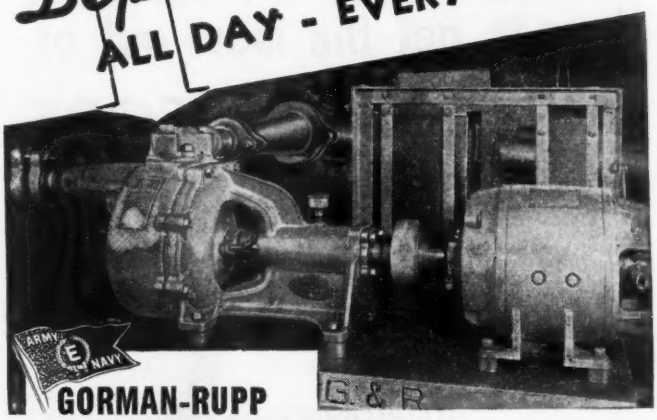

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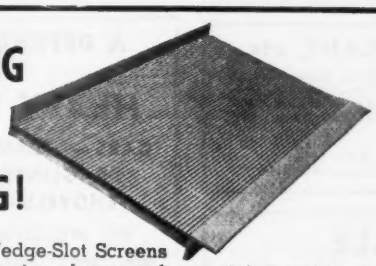

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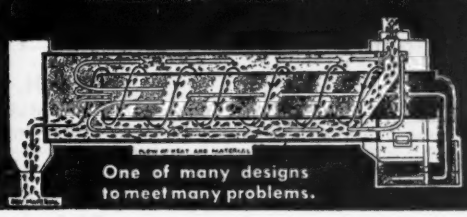

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167 ACRES Undeveloped Coal, Pittsburgh or River vein. East Finley Township, Washington Co. Pa. Seven foot vein. Priced to sell. James L. Brownlee, 3436 Clay St., Denver 11, Colorado.

FOR SALE 400 acres coal on royalty or outright basis. Half-mile to two railroads, on pavement to Chicago, on power line, six miles to city, boiler water available, good drainage, no grading necessary for switch. More acreage available if desired. C. D. Hansel, 2401 N. 9th St., Terre Haute, Ind.

COAL ACREAGE Wanted. Corporation will pay cash for going coal stripping operation with coal acreage, or will purchase coal acreage and strip with our equipment. State seam and thickness, analysis, amount of coal, height and type of overburden, proximity to railroad and other pertinent data. BO-297, Coal Age, 330 W. 42nd St., New York 18, N. Y.

PREPARATION PLANT, etc.

Tipple, washery including shakers, tables, booms, crushers, vibrators, retarders, etc. making seven sizes also railroad tracks, scale, machine shop, supplies etc. Good for strip or deep mine. Will sell, lease or invest.

BO-291, Coal Age
520 N. Mich. Ave., Chicago 11, Ill.

FOR SALE

Reasonable Coal Rights—5500 acres Bevier Seam—4 feet thick Shaft or Slope

W. N. JENNINGS
Moberly, Mo.

WANTED

Up to 1000 ft of 20 inch or 24 inch belt conveyor.

Also extra rollers and idlers

FRANKLIN COAL MINING CO.
Birmingham 3, Alabama

WANTED

Shovels (2), elec., 1½-yd.; Diesel-gas, 1¾-2 yd. Locomotives, 40 & 25 ton, std. ga., steam, gas. Crushers; Superior-McCully 20"; 36" x 48" jaw. Dragline, Walker or crawler, Diesel or elec., 2½ to 3-yd., 75' to 100' boom.
Portable crushing & screening plant, duplex. Hydroelectric gen. plant, 750 KW, 60' head.

H. Y. SMITH CO., Milwaukee 2, Wis.

LUMBER AND TIMBER

AVAILABLE NOW

for Mining and Construction from 1" up to 16"x16" Fir, Hemlock and Southern Pine. Deliveries at once by trucks or R.R. Cars.

HILLCREST LUMBER CO., INC.
1080 Grand St. Brooklyn, N. Y.
Phone: EVergreen 7-2121.

A DEPENDABLE SOURCE for HEAVY EQUIPMENT

CARS — CRANES — COMPRESSORS
DRAGLINES — LOCOMOTIVES
SHOVELS—TRACTORS—ETC.

WE WELCOME YOUR INQUIRIES

WE WILL FIGURE WITH YOU ON YOUR SURPLUS

B. M. WEISS CO.
Girard Trust Bldg. Phila, Pa.

BONDED SCALES, VIBRATING SCREENS, CRUSHERS

15 ton, 22' x 9' Truck Scale . . $ 440.00
20 ton, 24' x 10' Truck Scale . . $ 575.00
20 ton, 34' x 10' Truck Scale . . . $ 815.00
3 ton tipple scale . . . . . $ 135.00
3' x 6' Single Deck Screen . . . $ 495.00
3' x 8', Double Deck Screen . . $ 685.00
Double-Roll Coal Crusher . . . . $ 345.00

Immediate Shipments — Terms

BONDED SCALE COMPANY, MFRS.
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Phone Garfield 1651 Eve. University 2832

NEW and REBUILT
STORAGE BATTERY

LOCOMOTIVES

1½ to 10 Ton 13" to 56" Track Gauge

GREENSBURG MACHINE CO.
Greensburg, Penna.

Coal Strippers Call on ECONOMY COMPANY for Equipment

4 YD DIESEL

1940 dragline with 110' boom

Powered by 250 HP Fairbanks & Morse diesel engine 4 cu. yd. dragline bucket, 36" pads

This P&H Model 870 is like a new machine; is an excellent buy.

Big coal strippers know the value of big machinery. Its rugged strength is needed and the big bites of a large bucket speed stripping work and get the seam uncovered FAST.

While loading shovels are limited in size by your hauling equipment, still, here too, the largest dippers permissible are an economy, on account of faster loading. Check over the largest shovels and draglines that you can use. Then inspect the lists on this page for what you want.

For other sizes and types—wire or phone us—and we'll get them for you.

SHOVELS, CRANES and DRAGLINES

2½ yd diesel Link-Belt Model 480, 90' dragline boom. Speedomatic controls. Brand new D-17000 caterpillar diesel engine. 2½ yd dragline bucket

3½ yd Monighan, rebuilt from top to bottom, brand new 250 HP diesel engine, 110' aluminum boom, 3 yd and 3½ yd dragline buckets

1¾ yd diesel P&H 705 dragline, 60' boom, two heavy duty buckets. Just like a new machine ready for immediate shipment

8 yd steam Bucyrus-Erie Class 230 Dragline—175' boom, 6-8 yd buckets. A real buy. Located Mississippi

6 yd steam Bucyrus-Erie Model 220B stripping shovel—80' shovel boom—54' dipper stick

2½ yd Diesel Shovel and Dragline Combination

2—Exceptionally desirable 48B Bucyrus-Erie units will be released toward the end of February. Complete shovel attachment—60' dragline boom—2½ yd dragline bucket—Buda 6-cylinder Diesel Engine. Will be loaded on cars. Price only $21,400 each.

1¼ yd Lorain good condition at a bargain price—namely for $8300.

1 yd Byers Master shovel—ready to go $7450.

⅝ yd Bay City rebuilt shovel and dragline $5750.

¾ yd Byers Model 40 shovel and crane combination with trailer, very reasonably priced

1½ yd Model 77 Lorain shovel—rebuilt, guaranteed condition

2—¾ yd Lorain 40 shovel and dragline combination ready for immediate shipment

1943—5 yd Shovel

This 5 yd shovel was released from the factory in July 1943, and naturally is in exceptionally good condition. The shovel boom is 34' long—the dipper stick 22'6". This machine is electrically driven and powered by Westinghouse Motors. Standard guarantee goes with the machine

½ yd Bucyrus-Erie 10/20 shovel, backhoe and solid tired trailer. Pennsylvania location. Only $4900.

⅝ yd Bay City Model 2 dragline with 40' boom. Excellent condition $5300.

⅜ yd Bucyrus-Erie 10B shovel, trailer and truck. Price right.

¾ yd Built in 1939 and 1940

One P&H Model 255 shovel and dragline combination ¾ yd and one Koehring Model 302 dragline, 40' boom. Both rebuilt and guaranteed.

DUMP TRUCK BARGAINS

3—Euclid Diesel Dump Trucks, 18 yds. Cummins Diesel Engine. Tires on tractors 24.00x32 rear; 14.00x24 front, on trailer 24.00x32. Price: $7200 each.

2—Euclid Dump Trucks, 21 yd. Cummins Diesel Engine. Excellent condition. Tires 24.00x32 rear—14.00x24 front. Price $7300 each.

2—Sterling Diesel Trac-Tractors, Cummins Diesel Engine. Tires 10.00x20. In excellent condition. $5300 each.

2—Fruehauf Trailers Model T33, 16 yd. dump bodies. Power fifth wheel. Heil hoist, tandem axle, dual tires of 10.00x20. Air brakes. $1975 each.

16—24 yd. White end dump trucks.

8—12 yd. Euclid diesel rear end dump trucks.

14—Euclid diesel bottom dump trucks from 9 to 14 yds. capacity.

60—Ford, Chevrolet—International—Autocar and other manufacturer's dump trucks, from 1 ton up to 12 tons.

A list of all will be sent promptly upon request.

RD8 Tractor

1—RD8 Tractor with Hyster Double Drum Winch—Angledozer. Complete. Reasonably priced.

4—D8 Tractors with 15 yd. scrapers. Exceptionally good condition.

2—Caterpillar D7 Tractors with LeTourneau bulldozers.

2—D7 Tractors—late models—8 yd. scrapers. Pennsylvania location.

3—D6 Tractors with LaPlante-Choate Hydraulic Bulldozers.

2—D4—Good condition—ready to go.

A selection of sixty-five Caterpillar Tractors of 20 H.P. up to 125 H.P. Complete information on request.

4 Yd SHOVEL AND DRAGLINE

100B Bucyrus combination shovel and dragline with 4 cu. yd. dipper bucket and 4 cu. yd. dragline bucket —105' dragline boom in four sections Westinghouse Electric Motors. An exceptionally good buy for $44,000.

In addition to these shovels and cranes we can offer a great many larger shovels as well as ¾ yd, 1 yd, 1½ yd, 1¾ yd and 2 yd machines.

Let us know by phone, wire, or mail what size machine you require and we will send to you, immediately a detailed proposal and will gladly arrange for inspection.

ECONOMY COMPANY, INC.

49 Vanderbilt Ave., N.Y.C.

Tels. MUrray Hill 4-2294-8292-2295-2296

LOCOMOTIVES

Goodman: All 250 volts.
1—10 ton, 31-1-4-T.
1— 6 ton, 30B, 42" 1—5 ton.
1— 5 ton, W-1-2, 36".
2— 5 ton, 2600 K.
1— 6 ton, 33-1-4-T.
2— 8 ton 32-1-4-T.

Westinghouse: All 250 volt.
1—4 ton, 902, 48" 1—13 ton, 102, 42"
1—904 c. 44" 500 volt. Also 906 motors.
1—10 ton, 915.
Bar steel frames 10 ton, 6 ton, and 4 ton.

G.E.: All 250 volt. 4 ton 1022, 44" as is
6 ton 803, 44", as is 5 ton 825, 44"
6 ton 823, 44" 8 ton 839 motors
6 ton 301
8 ton 839
Battery Locomotives GE., Ironton and Atlas:

Jeffrey: 6 ton, and 4 ton, all gauges, 250 volt
1—Jeffrey MH 100, frame only.

MINING MACHINES

Jeffrey, 35B and 4—28A, 250 V. 4—29B, 29C, 29CE with shearing head.

Goodman, 12A, 12AB, 12AA, 12G3A, 24B
1—12G3 250 volt and 2—112 DA, 500 volt.
2—Permissible Type 12CA. 6—112AA,
2—124EJ.

Sullivan, CE7, CE9, CE10, CR10 Low Vein. CR5 for middle cutting.

SUBSTATIONS—275 volts, D. C.

2—200 KW G.E. Rotaries (600 volt).
2—150 KW West. Rotary.
1—200 KW 1—100 KW Ridgway M-G Sets
2—100 KW G.E. Rotary.
1—100 KW Allis-Chalmers Rotary.

SPARE ARMATURES

Jeffrey MH 110, MH 78, MH-73, 29B, 35B and 28A. Goodman 34B, 30B, 30C, 12A, 12AB, 12AA 33-1-4-T, 31-1-4-T. General Electric 801, 803, 819, 821, 825, 839. Westinghouse 904, 906, 102, 907, YR2, 115. Also 200 KW Westinghouse Rotary Converter Armature, 250 V. Bracket Type, 150 KW G.E. HCC Bracket Type, and 150 KW G. E., TC Pedestal Type.

AERIAL TRAMWAYS * HOISTS * PUMPS * MOTORS * TRANSFORMERS * BOND WELDERS * RESISTANCE * COMPRESSORS * DUMPS * SPEED REDUCERS FIELD FRAMES * ARMATURES * GOODMAN HYDRAULIC SHOVELS * MOTOR STARTERS AND CONTROLLERS—AC & DC * DROP BAR SUPPORTS (Gooseneck). 29B and 29C * MINING MACHINE TRUCKS * SWITCHBOARDS * CIRCUIT BREAKERS—AC & DC * CONVEYOR HOISTS * COAL CRUSHERS (double roll) 12"x16", single roll 24"x36", 24"x24" * ROPE & BUTTON CONVEYOR 400' long LATHES, SHAPERS * SWITCHES * AUTOMATIC CIRCUIT BREAKERS 250 volt 600 amps to 2000 amps * MANUAL CIRCUIT BREAKERS 600 amps to 3000 amps * HOISTS, overhead, AC. 3-60-440, 1 ton and 2 ton * 1 clam shell bucket 1¾ cubic yard. 1—Figure 8 drum * MINE CARS * 2 SULLIVAN BIT SHARPENERS * R.R. SWITCHES 85# to 100# HOISTS 5 HP AC and DC GENERATORS DC 250-275 volt, 30 KW to 100 KW. Also 50 KW 125 volt direct connected to steam engine. Goodman Scraper Loader.

GUYAN MACHINERY COMPANY, Logan, W. Va.

★ MINING EQUIPMENT READY FOR DELIVERY ★

GENERATORS

1—100-KW. G.E. type TC-6 Rotary converter complete with 2300 volt transformers and complete switchboard equipment, 250 volt D.C.
1—100-KW. Westinghouse, type SK-180, 250 volt generator complete with switchboard.
1—62½ KVA. 220 volt A.C. generator complete with switchboard and direct connected to 100-HP. Natural gas engine.

LOCOMOTIVES
All 250 V

1—5-Ton Goodman, type 8-A, 42" gage, with motor driven cable reel.
1—6-Ton Goodman, type 30-C, 44" gage, with motor driven cable reel.
1—8-Ton Westinghouse, type 65, 44" gage.
1—8-Ton Jeffrey, type MH-100, 36 to 44" gage.

CUTTING MACHINES

1—35-HP. Goodman standard with low vein truck, 250 or 500 volt.
1—35-A Jeffrey, 250 volt less truck.

MISCELLANEOUS

250—44" gage mine cars, 3-ton capacity, end dump.
1—Rope & Button conveyor outfit, 1" rope, 12" buttons.
1—Figure 8 Incline rope drum grooved for 1" rope.
2—Steel loading booms 42" wide, 38' long with 12' picking tables.
1—Belt conveyor 24" wide, 40' long (self contained).
1—5 x 8' Fairmont vibrating screen (double deck).

ALL-STATE EQUIPMENT CO.
LOGAN, W. VA.

ELECTRIC LOCOMOTIVES

1—10 Ton GE steel frame, 250 V, HM-830-A motors.
1—8 Ton Goodman, steel frame, 250 V, Type 3104-T, 42" track ga.
1—6 Ton West. bar steel frame with 904-C, 250 V motors.
2—6 Ton GE with HM-823 motors
1—5 Ton GE ready to operate, 42" ga.
2—5 Ton Goodman 250 V, 36" ga.

COAL CUTTING MACHINES

1—124EJ Goodman, 50 HP, 250 V, permissible track mounted slabbing machine.
1—35B Jeffrey 250 V shortwall.
1—35BB Jeffrey AC shortwall.
1—35B Jeffrey 500 V shortwall.
1—12DA Goodman, 50 HP, 250 V DC.
1—12G3 Goodman, shortwall, 3/60/220 V, AC.
1—12AB Goodman shortwall, 250 V, DC.
1—36B Jeffrey, 250 V, longwall.

OIL ENGINE UNITS

1—D-13000 Caterpillar Diesel Engine coupled to 100 KW 275 V, D.C. generator, 900 RPM.
1—240 HP Cummins Oil Engine to 125 KW 3/60/240 generator, 720 RPM.
1—165 HP GE Syn. 2200 V, 900 RPM motor.

Send us a list of any equipment you may have for sale.

TIPPINS MACHINERY COMPANY
Pittsburgh 13, Pennsylvania

-TRANSFORMERS-

BOUGHT and SOLD

We have several thousand transformers in stock for prompt shipment, and invite your inquiries.

PIONEER TRANSFORMER REBUILDERS

We rewind, repair and redesign all makes and sizes.

One Year Guarantee

THE ELECTRIC SERVICE CO., INC.
"AMERICA'S USED TRANSFORMER CLEARING HOUSE"
STATION M Since 1912 CINCINNATI 27, OHIO

MINE HOISTS

1—Vulcan Keyed drum 30" dia. Will coil 2500 ft. ¾" rope. 50 HP Motor.
1—Vulcan Band friction 42" dia. Will coil 3000 ft. 1" rope. 100 HP Motor.
1—Vulcan Man Hoist, 72" dia. Suitable 300 ft. shaft. Motor to suit conditions.
1—Nordberg Shaft Hoist, 72" dia. 150 HP Motor.
1—Vulcan Cylindro Conical Shaft Hoist 7'-9'—350 ft. wire rope. 400 HP Electrical Equipment.
1—Ottumwa haulage hoist, 84" dia. Will coil 10,000 ft. ⅞" rope. 400 HP Motor.

And other hoists to suit all mining conditions.

JONES MINING EQUIPMENT CO.
541 Wood Street, Pittsburgh 22, Pa.

RAILS NEW AND RELAYING

TRACK ACCESSORIES
from **5** *Warehouses*

- PROMPT SHIPMENTS
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- TRACKAGE SPECIALISTS

EVERYTHING FROM ONE SOURCE

L. B. FOSTER COMPANY
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RELAYING RAILS
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Immediate Shipment

MIDWEST STEEL CORPORATION
CHARLESTON WEST VIRGINIA

RAILS — CARS

All sections of rails and good serviceable second hand cars, all gauges, also spikes, bolts, frogs, switches and ties.

M. K. FRANK
480 Lexington Ave. New York, N. Y. Reno, Nevada
810 Park Bldg. Fifth Avenue Pittsburgh, 22, Pa. Carnegia, Pa.

48 In. CONVEYOR BELTS

1700 Ft. GOODYEAR 48 In. Wide 8 Ply 36 Oz. 3/16 Top 1/16 Bottom.
Excellent Condition.
IMMEDIATE SHIPMENT

R. C. STANHOPE, INC.
60 East 42nd St. New York 17, N. Y.

REBUILT EQUIPMENT—READY TO SHIP

MOTOR GENERATOR SETS

1—100 kw. 250/275 v. DC G.E. Gen. dir. driven thru coupling by 1—150 HP 2200 v. 900 rpm G.E. Syn. Motor.

1—300 kw. West. 600 v. DC 900 rpm Gen. direct driven through common shaft by 1—290 HP 440 v. 3 ph. 60 cy. West. Syn. Motor.

ROTARY CONVERTERS

3—150 kw. West. 3 ph. 60 cy. 275 v. 1200 rpm. Rotary Converters comp. with transformers, switchboard.

3—300 kw. West. 3 ph. 60 cy. 600 v. 1200 rpm. Rotary Converters comp. with transformers, switchboard.

MINING MACHINES—250 v. DC

1—CE-7 Sullivan 36" ga.

1—Armature for CE-7 Sullivan 250 v. DC.

MINE LOCOMOTIVES

3—5 ton Goodman 30 B 250 v. 36" ga.

1—5 ton Goodman 2600R Gathering Locomotive. 250 v. DC 42 or 44" ga. with cable reel.

1—10 ton West. 500 v. 40" ga.

1—10 ton Goodman Haulage or Gathering Locomotive, 250 v. 42" ga. Inside wheels.

1—13 ton Westinghouse 42" ga. 250 v. Locomotive, two motor type; single end control.

PUMPS

1—American Piston Pump, intake 5½", discharge 4½", size 8x12.

SLIPRING MOTORS—3 ph. 60 cy.

HP	Make	Type	Volts	RPM
300	G.E.	I	440	900
260	Burke	EMV-65	440	600
150	West.	CW	220/440	490
150/75	West.	CW	220/440/2200	580/290
100	West.	CW	220/440	685
75	G.E.	I-M	440	1200
75	West.	CW	220/440/2200	580/290
50	Chand.		220/440	1800
50	Allis Chal.		220	490
20	Westg.	CW	220	1735
15	Westg.	CW	220	870

230 V. DC Motors

HP	Make	RPM	Type
1	Louis Allis	1150	INA
1½	Westg.	2200	SK
1½	Westg.	1000	CD
1½	Westg.	900	SK
1½	Robbins Myers	1750	
2	Thompson	1100	
2	Northern	1000	
4	Westg.	1180	
4	Cr. Wh.	1170	CM
5	Cr. Wh.	960	CCM
5	Cr. Wh.	980	CM
5	Imperial	540	SK
5	Westg.	850	
5	Westg.	1600	RC
7½	Cr. Wh.	875	
7½	Cr. Wh.	940	CCM
10	West.	1325	S
10	Cr. Wh.	875	
10	Cr. Wh.	825	CM
10	Cr. Wh.	675	CCM
15	G.E.	850	RC
15¼	West.	965	S
35	G.E.	900	DLC

TRANSFORMERS—1 ph. 60 cy.

No.	Kva	Pri.	Sec.	Make
1	2	6600	110/220	G.E.
3	5	2300	220/440	G.E.
1	5	550	110	Pgh.
1	5	2200	110/220	West.
84	7½	2200	220/110	G.E.
32	7½	2200	220/110	West.
12	10	2200	220/110	West.
13	10	2200	220/110	G.E.
2	15	400/30000/50000		American
1	25	2200	220/110	G.E.
6	35	220	110	West.
3	37½	2200	440/220	West.
3	50	6600	575/440/220	G.E.
2	50	6600	550/440	Pgh.
2	50	6600	550/440	Al. Ch.
6	73	2200/4000	220/110	West.
6	73	440	205	West.
1	75	2200	220	Burke
6	75	2200	220/440	West.
3	150	2400	220/440	Allis Chal.

AUTOMATIC RECLOSING CIRCUIT BREAKERS

1—300 Amp. 275 volts, type RBI, serial No. 6193.
1—400 Amp. 275 volt, type CRL, serial No. 6327.
1—400 Amp. 275 volt, type ARL, serial No. 7536.
1—600 Amp. Class I, type AHD, 275 v. Ser. No. 8051.

DUQUESNE ELECTRIC & MFG. CO., PITTSBURGH (6), PA.

ROTARY CONVERTERS

500 KW AL-CH SYN 275 V. 6 Ph., 60 Cy., 1200 RPM. Pedestal Type, 2300/4000 V., Transformers.

300 KW G.E. SYN 575 V. HCC, 6 Ph., 60 Cy., 1200 RPM, form P, 2300/4000 V. Transformers.

150 KW G.E. SYN. 275 V., HCC, 6 Ph., 60 Cy., 1200 RPM, form P, 2300/4000 V., Transformers.

150 KW WEST. SYN. 275 V. 6 Ph., 60 Cy., 1200 RPM. Bracket Type, 2300/4000 V. Transformers.

MOTOR GENERATORS

500 KW G.E. SYN. 275 V., 2300/4000 V., 3 Ph., 60 Cy., 900 RPM, Manual Switchgear.

300 KW G.E. SYN. 575 V., 2300/4000 V., 3 Ph., 60 Cy., 1200 RPM, Manual Switchgear.

200 KW G.E. Ind. 600 V., 2300/4000 V., 3 Ph., 60 Cy., 1200 RPM. Manual Switchgear.

LOCOMOTIVES

13-T WESTGHSE., 250 V. 908-C Mts., 36"-48" Ga.
13-T GOODMAN, 250 V., 36-A Mts., 36"-42" Ga.
10-T WESTGHSE., 250 V., 907-C Mts., 36"-44" Ga.
10-T WESTGHSE., 500 V., 907-C Mts., 36"-44- Ga.
8-T WESTGHSE., 250 V., 906-C Mts., 36"-44" Ga.
8-T WESTGHSE., 500 V., 906-C Mts., 36"-42" Ga.
8-T GEN. ELEC., 250 V. 839 Mts., 36"-48" Ga.

Each unit listed above is owned by us and is available now for immediate purchase.

WALLACE E. KIRK COMPANY
Incorporated
501 Grant Building Pittsburgh, Pa.

FOR SALE

Frank J. Wolfe

LOCOMOTIVES

8—8-ton G. E., type HM-822 Mica Glass Insulated Coil Armatures, 250 volt B. B. motors, CY-21 reels. All completely rebuilt.

8—8-ton Goodman, 32-0-4-T, 250 volt B. B. motors.

3—8-ton G. E., type HM-819, 250 volt B. B. motors.

2—8-ton Goodman, flame-proof, 250 volt B. B. motors, late type. 44" gauge.

4—13-ton Jeffrey, type MH-77, 250 volt B. B. motors, 44" gauge.

2—13-ton Goodman, type 36-A, 250 volt B. B. motors, 44" gauge.

CUTTING MACHINES

8—29-C Jeffrey Bottom Cutters, 250 volt DC.
3—Sullivan CLU, 250 volt DC.
3—Jeffrey 35-BB, 250 volt DC.

LOADING MACHINES

2—260-A Goodman, 3 phase, 60 cycle, 220/440 volt AC.
2—7-BU Joy, 250 volt DC.
6—5-BU Joy, 250 volt DC.

MISCELLANEOUS

2—100 KW, (2) 150 KW, (3) 200 KW M. G. Sets, 250/275 volt DC, 1200 RPM, 3 phase, 60 cycle, 2300 volt AC, complete with switchboards and switchgear.

We have 4 and 5-track complete steel tipples, electric hoists from 300 to 1500 H.P. for slope, shaft and drift mines.

WE SPECIALIZE IN BUYING COMPLETE MINES THAT ARE GOING OUT OF BUSINESS OR FROM RECEIVERS IN BANKRUPTCY, ADMINISTRATORS OF ESTATES, ETC.

COAL MINE EQUIPMENT SALES COMPANY
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IRON and STEEL PIPE
New and Used
Large stocks, all sizes attractive prices
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P. O. Box 1647 Pittsburgh 30, Pa.

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MOTOR GENERATORS
ROTARY CONVERTERS
★ MOTORS & TRANSFORMERS
MINING MACHINES
LOCOMOTIVES

JOHN D. CRAWBUCK CO. PGH. (22) PA.

LOCOMOTIVES FOR SALE
2—80-Ton Lima, 6-Wheel, Switching Locomotives, New 1925-1927. Cylinders 21x26; T/E 35300#; Power reverse. Excellent condition.
IRON & STEEL PRODUCTS, INC.
40 Years' Experience
13484 S. Brainard Avenue, Chicago 33, Ill.
"ANYTHING Containing IRON or STEEL"

LIQUIDATION!

We are liquidating six complete power plants just purchased from the Georgia Power Company including:

22—High Pressure Water Tube Boilers, 200 to 600 H.P.

8—Turbo Generator Sets, condensing, from 275 to 2750 K.W.; all auxiliary equipment.

Above equipment operating as late as Dec. 1944

REPUBLIC TEXTILE EQUIPMENT COMPANY
40 Worth St. New York 13, N. Y.
Phone Cortlandt 7-1591

FOR SALE
2½ YARD ELECTRIC SHOVEL
P & H model 1250, Ward Leonard Controls.
FS-295, Coal Age
520 N. Michigan Ave., Chicago 11, Ill.

PROMPT SHIPMENT FROM OUR WAREHOUSE

MINING MACHINES

4—12 DA 50 HP 250 v. Goodman Shortwall
35 B Jeffrey 250 v. 6' cutter

STORAGE BATTERY LOCOMOTIVES

2—6 Ton G.E. Permissible Locomotives 36/44" Ga. O.S. armorplate frame. Inside steel tired wheels. 2-HM 825 Ball Bearing Motors, Type LSBE Class 2C6 From C9. 13½' long, 50" high, 69" wide and 44" Wheel base Each of the above units equipped with Edison Battery 80 cell A-10—one new in 1940, the other in 1939.

1—5 to 5½ Ton Type D Ironton, 36 or 42" Ga. Low Type, with Exide Battery.
1—5 Ton Atlas 40" or 44" Ga. with 2 Ball Bearing Motors. Battery box on top of locomotive.
4 Ton 36" Ga. Atlas, with Exide Battery.
4 Ton 36" G.E. (2 motors), with Exide Battery.

(Haulage)

13 Ton Westgh. 250 V. 36" or 40" Ga.
13 Ton Westgh. 500 v. 40" Ga.
10 Ton Jeffrey 500 v. 36/42" Ga.
6 Ton Baldwin West. 250 v. 36/42" Ga. #48747 904 Motors outside bar steel frame, inside steel tired wheels.
2—6 Ton G. E. 500 v. 42/44" Ga.
2—6 Ton G.E. 250 v. 42/44" Ga.
1—5 Ton West. 250 V. 36 or 42" Ga. with Electric Gathering Reels. Bar steel frame.

SCREENS

2—4' x 5' single deck Tyler Hummer Screens Type 37 equipped with V-16 Vibrators No. 2860 and 2867 designed for 110 v. AC 15 cy.

Rotary Con. & MG Sets (3 ph. 60 cy.)

2—300 KW G.E. HC 12 Rotary 275 v. 6 ph. with 2300 v. 3 ph. Trans.
100 KW West. 275 v. 600 RPM dir. con. 150 HP West. sq. cg. Motor.
100 KW Ridg—250 v. DC—2200/3/60 AC 1200 RPM.
100 KW West., 125 v. DC—2200/3/60 AC 1200 RPM
100 KW G.E. 275 v.—220/440/3/60 600 RPM Belted.
100 KW G.E. 275 v.—2200/3/60 900 RPM.

ENGINE GENERATOR & TURBINE SETS

100 KW 250 v. DC Westgh.—Skinner Engine.
57.5 KVA Allis Chalmers Gen. 220/3/60—Kerr Turbine.
50 KW West. 125 v. DC—Skinner Engine.
50 KW 125 v. DC West. Turbo Gen.

TRANSFORMERS

Qu.	KVA	Pri. V.	Sec. V.
31	7½	"	"
28	10	"	"
3	50	22000	2200

DC GENERATORS

100 KW G.E. 250 v. 850 RPM Type CL.
100 KW West. 275 v. 600 RPM Type M.
75 KW G.E. DLC 125 v. 700 RPM.
45 KW West. Type SK 125 v. 700 RPM.

SLIP RING & SQ. CG. MOTORS

HP	Make	Speed	WDG.	Type
500	G.E.	450	S.R.	MT 412
300	West.	1750	S.R.	CW
200	G.E.	250	S.R.	MT 412
200	G.E.	600	S.R.	I-M
187	G.E.	600	S.R.	I-M
150	G.E.	600	S.C.	I-L
150	West.	375	S.R.	CW
150(2)	West.	600	S.C.	CCL
125	G.E.	720	S.C.	I-K
125	Al. Ch.	720	S.C.	
100	West.	1750	S.R.	CW
100	Al. Ch.	690	S.R.	
100	G.E.	500	S.R.	MI-25 cy.
100	Al. Ch.	575	S.R.	
100	G.E.	1200	S.C	
60	Lincoln	900	S.C.	

Other sizes down to 1 HP

DC MOTORS—230 VOLTS

HP	Make	Speed	Wdg.	Type
175	G.E.	475	ser.	MD 109½
100	G.E.	700	cp. wd.	CL 90
130	G.E.	550	ser.	CO 1812 A
100	G.E.	480	ser.	MD 108
60	G.E.	600	ser.	CO 2507
25	West.	600	cp. wd.	SK 130
25	Reliance	850	cp. wd.	185 T

SYNCHRONOUS MOTORS

HP	Make	Voltage	Speed	Type
200	West.	2200	900	
150	G.E.	2200	900	ATI

Each of the above has a dir. con. exciter.

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16—Refrigerator, 36-Ft., 30-Ton
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9—Dump, Western, Automatic, 30-Yd., 50-Ton; lift doors
4—Dump, Western, 20-Yd., 40 & 50-Ton; steel floors
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18—Dump, K & J, Automatic, 16-Yd., 40-Ton
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10—Tank, 8000-Gallon, 40 & 50-Ton

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Buc.-Erie 42B steam shovel 1½ yds. cap.
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Browning 10-12 ton truck crane on Mack truck
Marion 371, 1¾ yard Shovel-Crane-Dragline
P & H 650 Shovel and Crane
Buc. Erie GA-2 Shovel, gas
Bucyrus-Erie 1½ yd. steam shovel and crane
P & H 203A Truck Crane, 8 tons
Bucyrus-Erie 42B 1½ yd. steam shovel and crane
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Buc. Erie 50B Steam Shovel 2 yds.
Buc-Erie B2 shovel and crane 1 yd. capacity
Universal Model 35 ½ yd. Shovel and Crane
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Lorain 75B 1½ yd. shovel-crane
75A Lorain 1¼ yd. shovel-crane
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Allis-Chalmers Model "L" tractor with Bulldozer
Caterpillar 40 Diesel with LaPlant-Choate Bulldozer
Caterpillar R-5 Tractor with Bulldozer
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One Allis Chalmers 150 K.W., 125 - 250 V. Erie Ball D.C.

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SPECIFICATIONS

Generator	Engine
Serial No. 110332	Serial No. 6440
Amps. 600	Bore & Stroke 16 x 20
R.P.M. 200	Four valve,
Compound Wound	non-releasing

Equipped with Allis Chalmers 13.3 K.V.A., A.C. transformer and panel board.

in good operating condition

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1—Gardner-Denver pump, size 5¾x6 with 5 h.p. G.E. Motor, 230 volts, D.C., 1150 rpm, Allen Bradley Starter, V belt drive.
50—2/0-38" Cross Bonds (New)
500 each—Trolley Clamps, bell insulators, and expansion belts, 4/0 Trolley wire splices.
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1—400 ton Montgomery coal washer jig.

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10 ton Goodman 42 ga. & 13 ton Jeffrey
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2 yd. Page 70' Boom Diesel Dragline
1¼ yd. Marion 450 Elec. Shovel
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Width	Ply	Top-Bottom	Covers	Width	Ply	Top-Bottom	Covers
48"	8	1/8"	1/16"	20"	5	1/8"	1/32"
42"	5	1/8"	1/16"	20"	4	1/8"	1/32"
36"	6	1/8"	1/16"	18"	4	1/8"	1/32"
30"	6	1/8"	1/16"	16"	4	1/8"	1/32"
30"	5	1/8"	1/16"	14"	4	1/16"	1/32"
24"	5	1/8"	1/32"	12"	4	1/16"	1/32"
24"	4	1/8"	1/32"				

Inquire For Prices - Mention Size and Lengths

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HEAVY-DUTY FRICTION SURFACE

Width	Ply	Width	Ply	Width	Ply
18"	6	10"	6	6"	5
16"	6	10"	5	5"	5
14"	6	8"	6	4"	5
12"	6	8"	5	4"	4
12"	5	6"	6	3"	4

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1"	50 "	8.00
	25 "	6.25
1¼"	50 "	12.00
	25 "	7.50
	35 "	10.50
	40 "	12.00
1½"	50 "	15.00
	25 "	10.00
	35 "	14.00
	50 "	20.00

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I.D. Size	Length	per Length	Couplings
½"	25 feet	$5.00	$1.50 Pair
	50 "	10.00	1.50 "
¾"	25 "	6.25	2.50 "
	50 "	12.50	2.50 "
1"	25 "	10.00	3.50 "
	50 "	20.00	3.50 "

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